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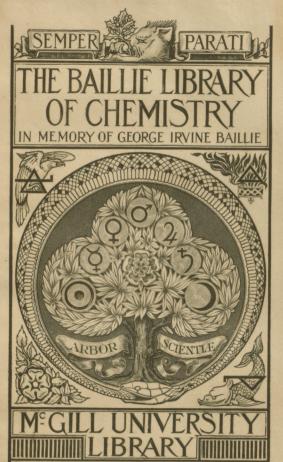
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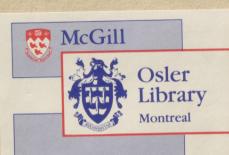
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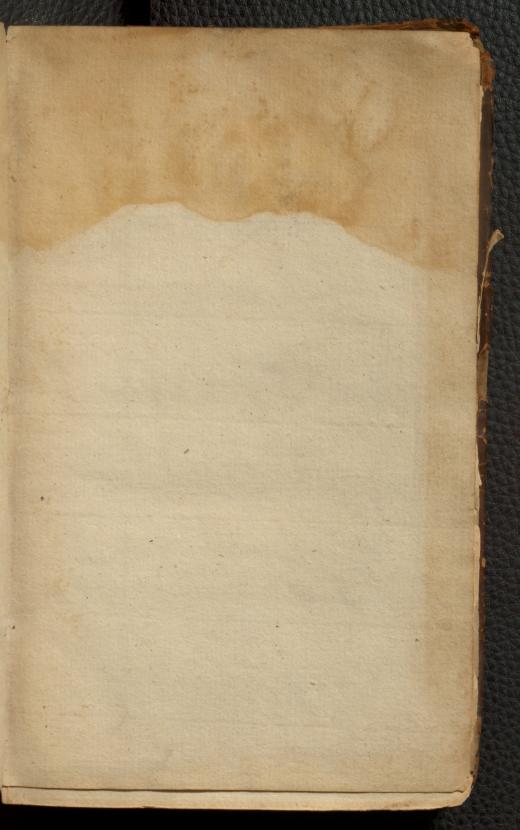
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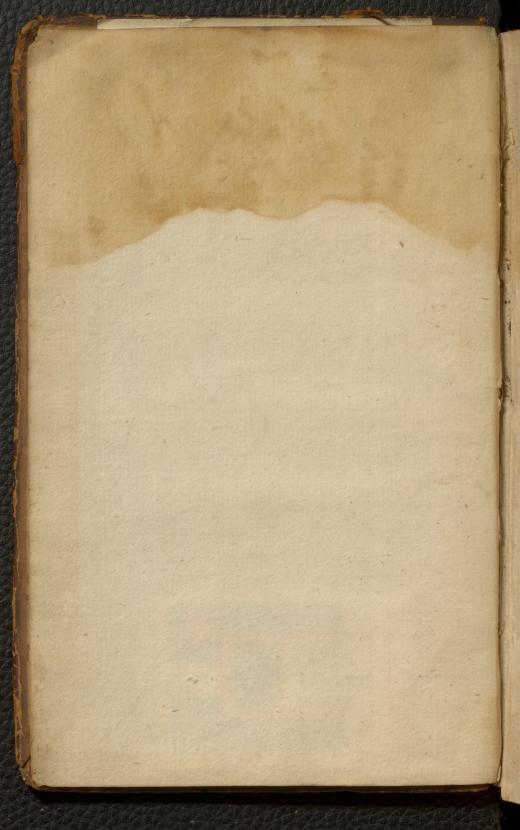
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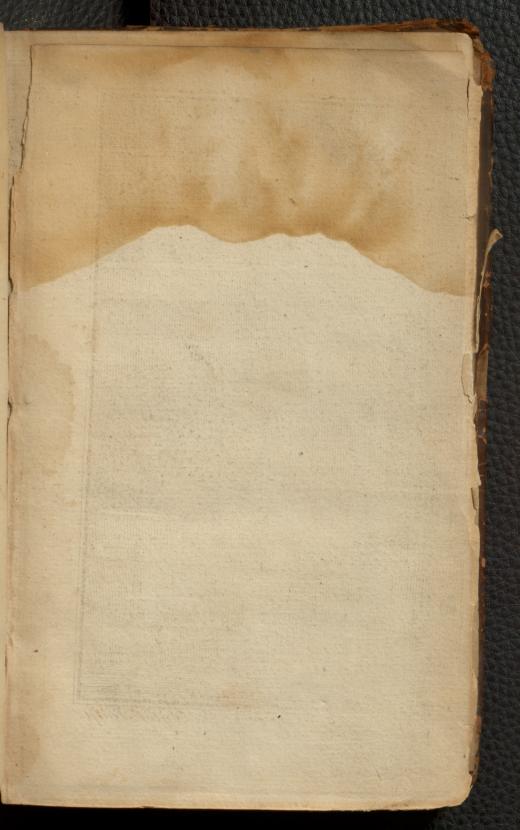
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A

TREATISE

ON THE The.

ORIGIN, NATURE, and VIRTUES

week or the control line O F and off or made the

CHALYBEAT WATERS,

AND

NATURAL HOT-BATHS, &c.



Lately published,

In ONE VOLUME OCTAVO, (Price 5s.)

- Adorned with COPPER-PLATES,

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The Theory and Practice of that Art are delivered in a familiar and intelligible Manner; the Furnaces, Vessels, and Instruments are described; and the Preparations of the several Medicines are laid down, according to the most easy and certain Processes. Together with a succinct Account of the several Drugs used in the Preparation of Chemical Medicines, as to their Nature, Production, and Country.

By JAMES MILLAR.

Printed for D. BROWNE, without Temple-Bar; and J. WARD, in Cernbill.



TREATISE

ONTHE

ORIGIN, NATURE, and VIRTUES

CHALYBEAT WATERS,

NATURAL HOT-BATHS.

With a Description of the

Mineral Waters in England and Germany.

Likewise Directions for the Preparation and Use of

ARTIFICIAL, HOT, MINERAL-WATER BATHS.

To which is added, an

APPENDIX,

SELTER WATER;

With many REMARKS,

Especially on its MIXTURE with TAR-WATER.

And also a Dissertation on

Baron SCHWANBERG'S LIQUID-SHELL;
With the Process for preparing the fame.

To which are annexed,

Occasional REMARKS and QUERTES on the GLASTONBURY WATERS.

With COPPER-PLATES.

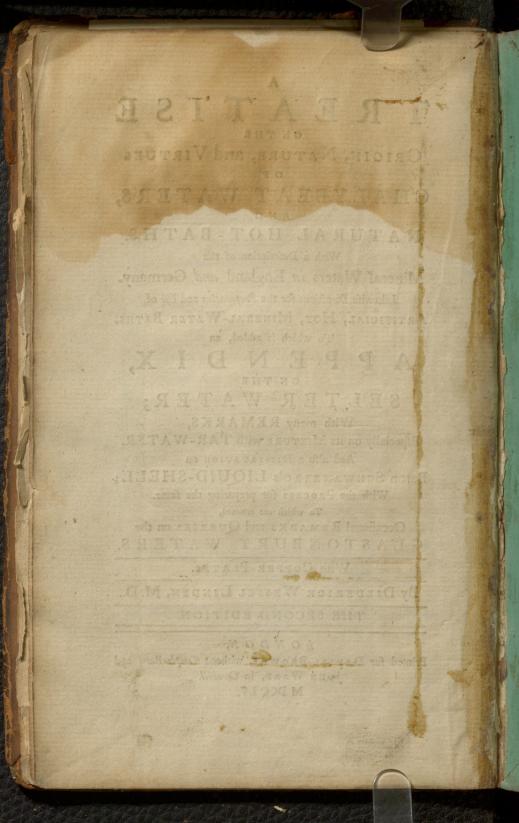
By Diederick Wessel Linden, M.D.

THE SECOND EDITION.

LONDON,

Printed for DANIEL BROWNE, without Temple-Bar; and
JOHN WARD, in Cornbill.

M DCC LV.





PRESERVING OF OBJECTS OF NATURAL HISTORY. -M. Drapier, Professor of Chemistry and Natural History, and one of the Editors of the Annales Gene. rales des Sciences Physiques, has substituted with suc. cess, in lieu of the poisonous matters employed in preserving objects of natural history, a soap composed of potash and fish oil. He dissolves one part of caustic po'ash in water, and adds to the solution one part of fish oil: he rubs the mixture till, it acquires a pretty firm consistence. When it is completely dry, he reduces it to powder with a rasp. One part of this powder is employed in forming a soft paste, or liquid soap, by means of an equal quantity of a solution of camphor in a musked alcohol. This li. quid soap is well rubbed on the skin of the bird, prewiously cleared of its far; the other part of the scap and powder is plentifully scattered between the fea. Thus prepared, the bird is placed is a moist situation, in order that the particles of soap may soften and attach themselves perfectly to the feathers, the down, and to the skin. It afterwards is put in a dry place. By this means it completely resists the attack of larvae, and has neither the danger nor the inconvenience of arsenical preparations; which, as is well known, stain and spoil the ex remities of the feathers and down.

USEFUL RECEIPT.—To REMOVE STAINS FROM MOURNING DRESSES.—Boil a good handful of fig. eaves in two quarts of water, till reduced to a pint. IBombazine, crape, cloth, &c. need only to be rubbed with a sponge dipped in the liquor, and the effect will be instantly produced.

INFALLIBLE REMEDY AGAINST BED BUGS.—Take one ounce of Campbor, wrap it in a linen cloth, and suspend it at the head of the bed. As the Campbor evaporates, the Eugs will decamp —This is a never-falling remedy.

DEDICATION.

render the Uses more extensive, of those Medicinal Waters in your MA-JESTY's Dominions of CLEVES, whose Sovereign Qualities have been render'd so notable by Experience; I have presumed that their own Sovereign was most rightfully entitled to this Humble Register of their Merits.

Your MAJESTY will, I hope, pardon this Presumption, the Effect of a constant and ardent Zeal for your Prosperity and Renown, in

Your MAJESTY'S,

Most Obedient,

and most bumbly

Devoted Servant,

Diederick Weffel Linden.

THE RECEIPT BOOK.

RECEIPT FOR MAKING BUTTER WITHOUT CHURNING.—Put the milk in a flat earthen dish, let it stand twelve hours, take off the cream, and put it in a round earthen dish, and stir it round with a clean wooden spoon, and it will come to butter in five or ten minutes.—N. B. The cream cannot be kept too cool during the time you are stirring it. It is therefore the best way to put your dish in some cold water. As soon as the butter is so forward that you can take off a little butter milk, keep put, ting in cold water and washing the milk out. You may keep your cream, after it is scalded, three or four days before making your butter—it will not but it.

RECEIFT for a French polish for beautifying woods for domestic purposes, and method of using it:—To one pint of spirits of wine add one half oz, of gum shell lac, one half oz, of gum lac, one fourth oz of gum shell lac, one half oz, of gum lac, one fourth oz of gum sandrick; place it in a gen le heat, frequently shaking it, till the gums are dissolved, when it is fit for use. Make a roller of list: put a little of the polish upon it, and cover that with a lineh rag, which must be slightly touched with cold drawn liaseed. Rub them in the wood in a circular direction, not coveraing too large a space at a time till the pores of the wood are sufficiently filled up. After this, rub in the same manner spirits of wine, with a schall portion of the polish added to it, and a most brilliant polish will be produced, if the article shellid previously have been polished with wax, it will be necessary to clean it off with fine glass paper.

HOOPING COUGH.—A Correspondent states to us that a plaister of gum guivanum applied to the chest will, in all cases, give relief, and in many complete cure. "This simple remedy," he observes, "has been used for many years by the mother of a large family, without a single failure.—We ourselves think it a good application to assist in the cure; and we think, as a warm and gently stimulating plaister, would be attended with benefit in most species of cough.—Medical Adviser, Jan. 17.

Hooping Cough.—A plaster of gum galbanum applied to the chest, will, it is asserted, in all cases, give relief, and in many a complete cure.

Refining, as, from Age to Age, it rolls, 'Till the clear Mirror images our Souls; 'Till Periods, fometimes so harmonious fall, Their very Cadence is Rhetorical:

Our Waters so, form their meandrous Course, Thro' Salts and Sulphurs, and Chalybeat Ores; Thro' echoing Caves, their tinkling Progress take,

To their own Music, their Procession makes

To their own Music, their Procession make; Reslecting, as, from Scene to Scene they stray, Each Object on their Surface, they survey; Digesting the Ingredients NATURE lent, And Cordials grow, that were mere Element.

VARIOUS Complexions then our Eyes enthrall;

She wears all Colours, and she cures in all.

When, from her Veins, the brilliant Nectar
teems,

Her Entertainments made of Liquid Gems;
A richer Draught than Cleopatra's was,
We think diffolved Diamonds in the Glass;
And when it sparkles with Cærulean Blue,
That she its Tincture from the Saphire drew;
Or, when in Shadwell Streams, our Cup she dips,

The molten Topaz, flowing at our Lips: Cou'd Midas at that Golden Stream arrive, Midas might wish, yet Midas drink, and live.

Such precious Banquets NATURE makes her Guest,
But You prepare, and order all the Feast.

Who

THE RECEIPT BOOK.

THE FAMOUS AMERICAN RECEIPT FOR THE RHEUMATISM.—Take of Garlic two claves, of Gum-ammoniac one Drachm, blend them by bruising them together; make them into two or three bolises with fair water, and swallow them one at night and one in the morning; drink while taking this receipt Sassafras tea, made very strong, so as to have the Tea-pot filled with chips.—This is generally found to banish the Rheumaism, and even Contractions in the Joints, in a few times using. It is vary famous in America, and One Hundred Pounds has been given for the Receipt.

A cork burnt thoroughly in the fire, then mixed upon a plate with a little milk and water, and taken two or three times, is said to be a cure for the CHOLERA MORBUS, by immediately correcting the acidity of the stormach.

CURE FOR THE PILES.—Let a tea-spoonful of epsom salts, and another of senna, be infused in a cup of ginger tea, and drank every morning an hour before breakfast. This infusion in every case prevents the disease, and in many persons performs a radical cure.—Medical Miscellany.

CURE FOR CANCER.—Sheep sorrel (leaf like that of clover) express the juice on a pewter plate—expose it in the sun until it assumes the consistency of salve—apply this as a plaster to the cancer, and change it occasionally as necessity may require. It will fully and entirely extract the cancer. If the disease be really cancer, the application will cause pain—if not, no pain will ensue.

To MAKE CURRANT WINE.—Let the currants be gathered on a dry day when the fruit is full ripe.
—Strip them, put them into a large pan, and bruise them with a wooden pestle; let the whole stand twenty hours to foment; then run it through a hair sieve, avoiding as much as possible to let the hands touch the liquor. To every six gallons put a quart of brandy, and let it stand six weeks; when fine, bottle it for use.

CURE FOR A COW SWELLING FROM CLOVER.—A dram Iglass full 4 spirits of turpentine in half a pint of new milk will gis immediate relief.

Seraphs, to deck them, and emblaze his Fame, Shall o'er the Skies bespangle LINDEN's Name: In glittering Characters, it there shall shine, A Constellation in the Watry Sign: While, bath'd in Bliss, he wasts at full Content, In Heavenly Streams, above the Firmament.

Gray's-Inn, Sept. 20, 1748. W. OLDYS.

Ad clarissimum Medicum & ingeniofum Chemicum, Diederick Wessel Linden, M. D.

OE TA falutifero tu pocula fonte miniftras; Mittimus, e contra, nos Heliconis aquas.

Limpsfield, Octob. 2, 1748. J. JONES, A. M.



THE RECEIPT BOOK.

The following receipt is offered to the notice of the public, as a cheap and efficacious remedy in scurvy and other cutaneous affections, by Mr. Wise, of Maryport, who has successfully employed it amongst his patients for upwards of twenty years.—Take dandelion (roots and tops), water cresses, and spruce fir tops, of each two pounds; boil them in five quarts of water to three quarts:—strain it into bottles, of which take half a pilit every morning one hour before breakfast.

A NEW MODE OF SHAVING.—Perhaps it may not be unacceptable to our readers to insert an effective way for every man to completely shave himself, by only mixing up with the brush in prepared thick lather—" One tea-spoonful of finely pounded best lump whiting," without the smallest danger to the razor's edge on the surface of the chin. Perhaps the very best edge may be given to the razor also, by throwing a pinch of whiting on a moderately oiled or soaped strop."—Mechanics' Weekly Journal.

neral, considered; what they contain, and om whence their Origin and Generation arrived.

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Containing a Geographical Description of the Town of CLEVES, and its Neighbourhood:
Also a Physical Account of the famous Spring of Chalybeat Water there; with the pleasant and

88. The following is a most excellent remedy for a cold I know not one that is so efficacious .- Take a large tea-cup ful of linseed, two penny worth of stick-liquorice, and a quarter of a pound of sun raisins. Put these into two quarts of soft water, and let it simmer over a slow fire till it is reduced to one; then add to it a quarter of a pound of brown sugarcandy pounded, a table-spoonful of old rum, and a table-spoonful of the best white wine vinegar, or lemon-juice.

The rum and vinegar are best to be added only to the quantity you are going immediately to take; for, if it is put into the whole, it is apt in a little time to grow flat.

Drink half a pint at going to bed, and take a little when

the cough is troublesome.

This receipt generally cures the worst of colds in two or three days, and, if taken in time, may be said to be almost an infallible remedy. It is a most sovereign and balsamic cordial for the lungs, without the opening qualities which endanger fresh colds in going out. It has been known to cure colds that have been almost settled into consumptions in less than three weeks:

89. Paregoric Elixir.—Take of flowers of benzoin, half an ounce; opium, two drachms. Infuse in one pound of the volatile aromatic spirit, for four or five days, frequently shaking the bottle; afterwards strain the elixir.

This is an agreeable and safe way of administering opium, It eases pain, allays tickling coughs, relieves difficult breathing, and is useful in many disorders of children, particularly

the hooping cough.

The dose to an adult is from fifty to an hundred drops.

90. Stomachic elixir .- Take of gentian root, two ounces; Curassao oranges, one ounce; Virginian snake-root, half an ounce. Let the ingredients be bruised, and infused for three or four days in two pints of French brandy; afterwards strain out the elixir.

This is an elegant stomachic bitter. In flatulencies, indigestion, want of appetite, and such like complaints, a small glass of it may be taken twice a-day. It likewise relieves the

gout in the stomach, when taken in a large dose.

93. Yellow basilicum ointment.-Take of yellow wax, white resin, and frankincense, each a quarter of a pound; melt them together over a gentle fire; theu add, of hogs' lard prepared, one pound. Strain the ointment while warm.

This ointment is employed for cleansing and healing wounds

and ulcers.

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A DISSERTATION on the LIQUID SHELL; with Instructions to prepare the same.



CHAP.

- 68. Honey water.—To every quart of rectified spirits of wine, put six drachms of essence of ambergris; pour it into a bottle, and shake it well daily.
- 69. Windsos soap.—Cut some new white soap into thin slices, melt it over a slow fire, and scent it with oil of caraways, or any other agreeable scent; when perfectly dissolved, pour it into a mould, and let it remain a week, then cut it into such sized squares as you may require.
- 70. Weak eyes.—May be relieved by washing them frequently in cold water; or dissolve four grains of the sugar of lead, and crude sal ammoniac in eight ounces of water; to which add a few drops of laudanum, and with this mixture bathe the eyes night and morning.—Rose water is also good for the eyes.
- 71. Inflamed eyes.—Leeches should be applied to the temples, and when the bleeding has ceased, a small blister may be applied, and a little opening medicine taken. Shaving the head, and bathing the feet in warm water, will in some cases be found very beneficial.
- 72. Worm-powder.—Worm-powder is made of an ounce of tin finely powdered, and two drachms of Ethiop's mineral, mixed together, divide it into six parts or doses, and take one of them in a little syrup twice a day: when they are used, work them off with a little rhubarb.
- 73. Freckles on the face.—To disperse them, take two ounces of lemon-juice, half a drachm of powdered borax, and one drachm of sugar, mix them together, and let them stand a few days in a glass bottle till the liquor is fit for use; then rub it on the hands and face occasionally.
- 74. Spermaceti ointment.—Take half a pint of fine sallad oil, half a pound of white wax, and an ounce of spermaceti; melt the whole over a gentle fire, and keep it stirring till the ointment is cold.
- 75. Lip salve.—Take four ounces of white wax, one ounce of spermaceti, and half a pint of oil of almonds, melt it in a water-bath, similar to receipt No. 28; when melted, put in a small quantity of alkanet root, tied in a linen bag, so as to prevent it mixing with the other ingredients, the colour being the only part wanted, which the heat causes to ooze through the cloth or bag. Stir it with a clean knife till it becomes red; take out the alkanet root, and add a little essence of lemon or bergamot, run it into pots or boxes for use.

to be filled in his Presence, by Order of Mr.



F. Jones, Mineral Water Purveyor to his Royal Highness the Duke of Cumberland, were filled at the Pouhon Spring, when the Water was in its greatest Persection, being sealed and done up with all imagin-

able Care, agreeable to our Certificate sent with each Quantity of Water to the said F. Jones. In Witness whereof we have caused our Secretary to sign and seal these Presents, at the said Town of Spa.

Par Ordonnance, J. Storbeaux Greffier.

Spa in Germany, April 25, 1747.

This is to certify, that I Alexander Hay of Spa have contracted with F. Jones of London, to fell our true Poubon Water: The said Jones having engaged not to deal in any false Water. The Nobility and Gentry may be assured, that the Poubon Water, sent to the above-mention'd Dealer, is taken up at the only proper Season, and secured in the most effectual Manner, by me,

Alex. Hay.



The faid F. Jones has fettled fuch Correspondence for the Pyrmont in large and small Bottles, and Selter Water in large Stone Juggs, that their Goodness may be entirely depended upon. The Pyrmont Water is

fealed with the Prince of Waldeck's Arms.

The

- 51. A liquor to remove spots, &c.—Dissolve two ounces of pearlash in a quart of spring water, to which add two lemons cut into small pieces; mix this well, and keep it in a warry state two days, by placing it near the fire, then strain it off, and keep it in a bottle for use.—To use it, pour a little upon the stained part, and the moment the spot disappears, wash the part in cold water. This is a most useful article to remove pitch, grease, &c.
- 52. Nankeen dye.—Boil equal parts of arnatto and common poolsh in water till the whole are dissolved. This will produce the pale reddish buff, so much in use, and sold under the name of nankeen dye.
- 53. To dye silk a fair blue.—Take white silk, and soak it in water, then having wrung the water out, add eight ounces of woad, four ounces of indigo, and one ounce of allum; then gently warm and dissolve them in the water: after which, dip your materials till the colour has taken.
- 54. To stain leather gloves.—Those different pleasing hues of yellow, brown, or tan colour, are readily imparted to leather gloves, by the following simple process:—Steep saffron in boiling-hot soft water for about twelve hours, then having slightly sewed up the tops of the gloves, to prevent the dye from staining the insides, wet them over with a sponge, dipped into the liquid.—The quantity of Saffron, as well as of water, will, of course, depend on how much dye may be wanted, and their relative proportions on the depth of colour required.—A common tea-cup will contain sufficient in quantity for a single pair of gloves.
- 55. To make spruce beer.—This cheap and wholesome liquor is thus made: take of water sixteen gallons, and boil the half of it; put the water thus boiled, while in full heat, to the reserved cold part, which should be previously put into a barrel, or other vessel; then add sixteen pounds of treacle or molasses, with a few table spoonful of the essence of spruce, stirring the whole well together; add half a pint of yeast, and keep it in a temperate situation, with the bunghole open, for two days, till fermentation subsides; then close it up, or bottle it off, and it will be fit to dripk in a few days afterwards.

^{80.} Draught for a cough.—Beat two tresn eggs, mix them with half a pint of new milk warmed, two table spoonsful of capillaire, the same quantity of rose-water, and a little nutmeg. Observe, it must not be warmed after the egg is added. Take it the first and last thing.

at One Shilling per Bottle; at Two Shillings and Six-pence per Half-pint Bottles, and so in Proportion, with reasonable Allowance to the Wholesale Purchasers. The Bottles will be sealed with Dr. Linden's Coat of Arms.

N. B. Any Quantities prepared according to the third Process, may be also had upon Order, at the most reasonable Rates, at the above Places.

Also the Neville Holt Spaw Water is sold constantly fresh by the said T. Prostor.



CHAP. I.

The Chalybeats, or Spaw-Waters in General, confidered; what they contain, and from whence their Origin and Generation are derived.

Halybeat, or Spaw-Waters, by the Ancients called Acidulæ, are fufficiently known; and, to the best of my Information, no less than forty or fifty different Authors, in this Kingdom, have wrote upon them, and the warm Baths, by the Ancients called Thermæ, within these last Hundred and Fifty Years. Several of these Authors have examined these Chalybeat Waters, and have given us some Analysations of their constituent Parts; but so imperfectly, that they have, either by supposing some Ingredients which are not, or difregarding others, which are in their Composition, drawn such erroneous Conclusions of their Virtue or Application, that I dare venture to fay the Advice frequently given to the Afflicted, for the Use of these Mineral Waters, is not, to this Day, built upon a rational System, but chiefly founded upon an Emperical Notion, That they frequently before have removed, or given Relief in such Diseases, wherewith the Patient

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is supposed to be afflicted, and therefore he must go on in the same Road: And this is chiefly the Foundation for the Advice to, and

Use of the Chalybeat Waters.

Or if it should happen that the Physician, under whose Care the Afflicted is, should, upon the Credit of famous Writers, suppose a certain Ingredient in this Water Concrete, sit to remove his Patient's Distemper; and this same Ingredient is judged, in some other Distemper he may be at the same Time grieved with, very pernicious or prejudicial; and yet both Diseases may perhaps, and have been, at different Times, removed by the Mineral Waters: And at last it shall be found the supposed Ingredient cannot possibly exist in those Waters, I will in this Case leave it to the Decision of impartial Judges what Mischief these Misconceptions may occasion.

To prove this my Affertion, I have a very modern and eminent Example before me. My famous Countryman Dr. Hoffman positively affirms, That Chalybeat Waters contain a great Share of Alkaline Salts. His learned and ingenious Translator has not rectified this Error, but rather supports Dr. Hoffman's Notion in this Respect. I doubt not in the least, that feveral Phyficians who read these two Great Men's Works, take it at once for granted; and fuch Patients, whose Cases they fuggest require that imaginary natural Alkaline Medicine, are ordered to these Waters. They may fometimes have the Happiness to restore such Patients, which then is immediately

immediately attributed to this whimfical natural Alkaline Salt, and called a felf-evident Proof, without further Search for the real Cure; but as there is not a Grain of Alkaline Salt in all the Chalybeats or Spaw-Waters in Europe, which I shall prove hereafter; I appeal to the Judicious, if this is not going too far upon Trust, and therefore, whether it is not forthwith necessary to make such further, or different Examination of these Waters, as may enable us to account for their Efficacy from other Principles, to which their Virtues

may be more truly attributed.

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There are some other ingenious Gentlemen who have fancied the Chalybeats to be impregnated with Nitre or Salt-Petre, and with many Salts more. A learned and eminent Phyfician gives us, in his Hiftory of Mineral Waters, feveral Sculptures, representing the Crystals produced out of the Waters he has examined, in which he feldom forgets the Nitre or Salt-Petre, as one of them; but he has fo many Salts, that he hardly can find Names for them all. Therefore, to prevent any further unnecessary Trouble therein, I shall endeavour to demonstrate the Impossibility of any Nitre or Salt-Petre existing in the Chalybeat Waters.

It has always feemed an Impropriety to me, to name one Part of a certain Mixture by a Name that is due to a Compound, where this is only but Part thereof. And so improperly do those Authors write, who affert that there is a Vitriol in the Chalybeats or Spaw-

B 2

Waters,

4 On Chalybeats, CHAP. I.

Waters, when the Acid of Vitriol alone is to be found therein. How unreasonable is it then to call this Acid a downright Vitriol? Would not the Brewer be laughed at if he called Water Beer, though Water is the chief Ingredient? But it cannot be called Beer, unless the whole Mixture is compleat: I think

the fame of Vitriol.

Other Writers deny the Affistance of the Air in the Generation of the Mineral or Spaw-Waters, as being unfit for conveying the Acids and other Volatile Spirits, and uniting them with the Water. An eminent Gentleman of the Faculty, for whom I have a great Esteem, confesses himself at a Stand in this Respect, and complains that he is at a Loss for an Examination of this Acidum vagum, as it is sometimes called: To render it therefore sensible to the Public Ideas, I shall endeavour, by a few Experiments, to give some Light herein.

It is also by others imagined that Sea Salt, conveyed in subterraneous Channels to the Chalybeat Waters, is the chief Cause of the Neutral Salts, a common Ingredient of Mineral Waters: And it is supposed that these Salts are resolved into the Neutral State by Help of the subterraneous Fire, and that this Fire performs its Operation as that over which the Cooks boil a Kettle of Broth, or a Piece of Meat. Many other Imaginations have been indulged of these Mineral Waters, too extravagant to be here mentioned, as tending absolutely to cloud any reasonable System that possibly

possibly might be framed for the rational and beneficial Use of them.

I will not enter into any Disputes concerning those different Opinions; but only briefly relate, for what Reason the above-mentioned and many other Ingredients cannot possibly exist in the Chalybeats; and then will set forth those Parts that may be reasonably expected in these Waters, hoping by this means to gain some small Step towards settling the Contents, Nature, and Virtues of them upon a more rational Foundation, fo as to render them of more extensive Service, and less liable to Abuse, than they have hitherto been.

As to the Alkaline Salt that Hoffman afferts to be in the Chalybeats or Spaw-Waters, they are very fmartly denied by Dr. Short, and his Arguments are reasonably supported upon this Topic. In this Particular he has been absolutely more exact in his Experiments than Dr. Hoffman, and if he happens fometimes to divert himself with the Professors of Chemistry, I suppose he means only the Chemicasters, and not any of the true Adepts or regular Brethren of the Profession; because it would be impossible to produce one Grain of Salt, or any other Matter, out of the Mineral Waters, if it were not for the Affistance of Chemistry; and without this Art it would be impossible to come at any true Knowledge of the Salts; and the most expert Chemists affert, it is impossible to arrive at any Perfection in this Art, without a thorough Know-

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ledge of the Salts; which they confider as one of the chief Supporters of this Science.

Indeed we should be here careful to diftinguish the Character and Province of a true and folid Chemist; and not reckon, that the Bufiness of his Art consists in the minute Speculation, or Mensuration of the fmallest Particles; or that, by magnifying and disproportioning of Atoms, or other Objects, like the Virtuofo, through his Spying-Glaffes, he is to make his Judgment, and Conclusions proportionable. Thus to amplify the Shapes, Forms, and Figures of Aquatic Productions, as they happen in Crystallization, with Geometrical and Mathematical Instruments, and to give Tables or Sculptures of them accordingly, and thereupon to pronounce the Quality of the Matter in Queftion, is too apt to amplify also our Conceits of, and Reasonings upon them, beyond their due Limits: So that they are often rejected, as amufing Delufions, as meer Speculative and Closet Chemistry, which will not answer the Ends of more fubstantial Experiments. For true Chemistry is Scientia demonstrativa; and therein we permit no other Decision of this Art's Subjecta & Objecta, than that which confirms itself by the established and regular Practice. In short, we admit Nothing of that Corpufcular Philosophy, which is fo spaciously advanced, and extended, in pompous Prints of Crystallized Salts, and such like. which ferve for little more than Ocular Amusement, the Employment of Engravers,

and the Consumption of Paper. When after all, without true Chemistry, which only, here, ought to come under our Cognizance, it is impossible to perform any true Analysation, or frame any solid Judgment of the Chalybeats; and in this Particular Dr. Hoffman is in the right, however others less versed in the true Practice of Chemistry may not relish it.

But from this Digression to return to my Topic, concerning the Alkaline Salts in the Chalybeats or Spaw-Waters; it is very well known that Nature furnishes us not with any Native Sal Alkali, either Fixed or Volatile. Such fixed Alkaline Salts as make Soap run easily in the Fire, &c. and have the other Qualities correspondent with this Salt, too extensive to be repeated here, and such Volatile Alkali's as precipitate a Solution of Copper, even in the smallest Quality Blue; I say fuch Alkaline Salts are nothing more than Artificial Productions, and no where to be met with in Nature. I should be very glad to fee these Native Alkaline Salts, and as soon as I have feen, examined, and found them to be true Alkaline Salts, I shall be very ready to correct myself, and make my Apology to those Gentlemen whose Affertions I may have made any Doubt of in this Particular.

All that I have hitherto understood of Nature's producing, that may in any Degree deferve the Name of Alkaline, has appeared to me in no Shape whatsoever as a Salt, being nothing else but Alkaline Earths, which we

may divide into two Sorts, the one coarfe, and the other fine. One is the Creta, under which Denomination is all Chalks; these are the coarser; and the finer Sort is the Alkaline Earth of the common Salt; which gives the Texture to this Salt, or properly speaking, the Volatile Acid of this Salt is detained by this Alkaline Earth, which is so fine, and so closely united with the Acid, that they pass through the Filtre when the Salt is dissolved. These are the Alkali's that properly may be called Natives, and yet they deserve not the Name, because there are many Qualities wanting which are requisite to constitute a true Alkali.

The coarser Sort of these Alkaline Earths are never sound pure and clean; but we always find them upon Examination to have a Mixture of Acid Salts, which resemble not in any Shape an Alkali; and, for the Truth of these my Assertions, I appeal to Experiment itself, as the only Touch-stone whereby

this Controversy can be decided.

But if there is sometimes found in the Chalybeats or Spaw-Waters any Matter that will occasion an Effervescence with Acids, it is nothing else but the Alkaline Earth of common Salt, or another absorbent Earth, that is commonly the Basis of the Neutral or Purging Salts of those Waters, or it is Chalk itself; which two latter are such frequent Ingredients, that there are hardly any without it; but the Alkaline Earth of the common Salt is more rare in these Mineral Waters;

and

and for the Truth of this I appeal again to

Experiment, and strict Examination.

As to what might be further faid in Anfwer to Dr. Hoffman's Opinion of the Alkaline Salts, it may be unnecessary for me to make any more Animadversions thereupon, fince they have already been fo amply exhibited by Dr. Short, that I need only here refer the judicious Reader to what he has said upon this Occasion *:

Now

* I shall here make Use of Dr. Short's own Words, and recite that Part of his Animadversions upon Dr. Hoffman's Doctrine of Alkaline Salts in the Sparw Waters, which is in the Preface to his Book of Mineral Waters, Page VI, VIII, VIII, and IX, as followeth: " Let us descend to an Author of still greater " Note, viz. Dr. Frederick Hoffman; he fays, the Proofs of an " Alkaline Salt in Mineral Waters are, 1. Their Conflict with " Acids. 2. The Solution of their Salt in Water turns Syrup " of Violets green. 3. The fame Solution with Spirit of Vi-" triol makes Tartar vitriolated. 4. This Solution turns a So-" lution of Sublimate Mercury yellow, &c." Here we are to try these Experiments with the Sediment in the Gos, a great Part whereof is Lime-stone Powder, which cannot possibly fail to ferment with Acids, nor to turn Syrup of Violets green. He fays, "Three Pints of Pyrmont Water exhaled, left only 40 "Grains of Sediment, which was an Alkaline Salt, and fer-" mented violently with Oil and Spirit of Vitriol." I took Care to procure a Bottle of this Water genuine, exhaled three Pints of it, and had 72 Grains of Sediment, whereon I poured warm Water, then gave it a double Filtration, and procured 30 Grains of beautiful white Salt, which fermented neither with Oil, nor Spirit of Vitriol, nor Oil of Tartar, nor Spirit of Hartshorn; Spirit of Salt poured upon it, after they had been mixed a Mo. ment or two, it smoaked; this Spirit poured upon clean China, or its Bottle uncorked, did the fame; fo that we cannot allow this for a Fermentation, though any of the Acids, dropped upon its Earth, caused a vehement Ebullition. This is the Effect of examining Sediments by the Lump, only to fave a little Labour and Time. It is evident that, this Water containing so much Salt, a large Quantity of it drank must open the Belly, only from its Salt, and not the Doctor's Philosophy. Now the fixed Contents must be the same in England as at the Spring, the Water

Now let us proceed to the Hypothesis of those

having not been corrupted or spoiled. In another Place he tells us, that all the Acidulæ contain a pure Alkaline Salt, which raises a Conflict with any Acid; from which it is very plain, he either tried few, or made his Experiments on the whole mixed Sediment. Nor can I find that he has been at the Pains to crystallize any one Salt, but taken their Genus's on slight and unfatisfactory Evidences; for I have feen few or none of the refined Salts of those Springs, that would raise a brisk Ebullition with Acids. His whole History is too short, his Experiments too few, his Conclusions meanly grounded, and not fully established. He says the Waters of Egra are Chalybeat, yet neither Salt nor Earth ferment with Acids, then it cannot be Alkaline, though not common Salt. It must be owned that Hoffman affords more Truth and greater Certainty toward a Natural History of Mineral Waters, than all his Predecessors together; for, tho' a Chymist, he retains the least of their Dialect of any, and, tho' a good Philosopher, yet advances the fewest, and is the least attached to Hypotheses and Speculation, of all that have wrote on this Subject; but it is to be wished he had been more confistent with himself: For in one Place, "he lays the Mistakes " of preceding Writers on Mineral Waters on their Want of " Knowledge in Chymical Operations," and that he must have Recourse to Chymistry; but afterwards, " he gives the Chy-" mical Analysis of Mineral Waters for one of the four Cardi-" nal Errors, which have prevailed to their Difcredit." Where he explains the Origin of the Mineral Spirit in Waters, he fays, " this extream moveable, fubtile, and elastic Spirit is a Portion of the universal Spirit, the Fountain and Cause of all parti-" cular Spirits in other Things, whether in the Vegetable, A-" nimal, or Mineral Kingdoms." But this Spirit has its principal Seat, and exercises its Powers chiefly in Sulphur. Which Distinction and Account of the Origin of the Spirits in the Mineral Waters, in this diffusive and unlimited Sense, are manifeftly ridiculous. But when he lays afide his Chymical Cant, and talks intelligibly, then he tells us, " that this Spirit is the "Vapour that arises from heated or burning Marcasites. Spirit " of Vitriol poured into the Water of Egra raises a manifest Ebullition, but when he had exhaled the Water of Egra and " poured Oil of Vitriol (which is a stronger Acid than the Spirit) " upon its unseparated Sediment, there ensuing no Struggle or " Effervescence." This is surprizing, that the Water should ferment with a weaker Acid, and not the Sediment with a stronger. But he is still more out in what follows, viz. " Which " shews this Water contains no Proportion of common Salt: now Oil of Vitriol dropped on common Salt raifes a very great " Effervescence."

or Spaw-Waters in General. 11

those Gentlemen who fancy that Sal Nitre, or Salt-Petre is contained in the Mineral Waters. When these are reminded, that they are to consider, all Nitre and Salt-Petre are only Artificial Salts, they will perceive the Mistake to have lain, in their following, too implicitely, the Doctrine of those who have represented the Salt-Petre and Nitre to be Native Salts. But Nature without the Assist-

" Effervescence." Take this Hint once for all, that whenever he separated the Earth and Salt, then found the last ferment with Oil of Vitriol, it is an Alkaline Salt with him, when in Truth it is a certain Mark of common Salt; and this Mistake he could not avoid, except he had crystallized the Salt. He says, "the Virtue of all purging Waters depends upon a certain neu-tral cleanfing Salt." But the Waters of Swalback ferment with Acids, are therefore Alkaline, and yet purgative; but this Quality depends upon his Philosophy, viz. the fine Mineral Spirit, and subtile irony Principle; but let him separate the Salt, and if it purge with the other Principles, and his Philosophy into the Bargain, except drank in unreasonable Quantities, Iwill own myfelf fairly in the Mistake; or otherwise all these Waters highly impregnated with a mineral Spirit and irony Principle, but very little Salt, should purge, which is true of none of them. He is very fanguine against the Existence of folid or fixed Vitriol in Mineral Waters, " is positive it can be " proved by no Arguments nor Experiments, that a Grain of " it cannot be procured from a hundred Pints, and to affert " the contrary is an Error in the Examiner from his Want of "Knowledge in Chymistry." It might be a sufficient Answer to this, should I say, I know of no Difference betwixt Fixed and Volatile Vitriol, but the Smallness of their Parts, one confifting of fuch small Particles as are capable of Elevation in the Air, either upon being long exposed thereto or warmed by the Fire; the other being groffer endures the Force of Exhalation or Distillation, but the Principle is the same; but more directly, there are Mineral Waters which contain fixed Vitriol, a pregnant Instance whereof we have in Malton Waters, and all the Coal Waters in this Country contain fixed Vitriol only. And as there are different Degrees of Volatility of this Principle to be met with in Mineral Waters, I do not apprehend the Absurdity of faying it fometimes exists in fo large Particles, as to endure the Force of Heat in Exhalation.

ance of Art never can produce one fingle Grain of Salt-Petre. Salt-Petre or Nitre is a Compound, and confifts at least of four or five different Ingredients, of which Nature accidentally, or by Defign of the Artist, generates one Part. The Foundation of this Generation confifts in Putrefactions, Animal and Vegetable, in a peculiar Earth, which may accidentally exist, but frequently, in many Countries, is adapted by the Artist for this Purpose; and, when properly managed, may produce a confiderable Quantity of Salt-Petre. This first and single Ingredient of that Compound, called Salt-Petre, is properly called Hali Nitrum, or Aphro Nitrum; when this Hali Nitrum is obtained, then Art must again affift, not only to lixiviate it out of the Matrix, which is the proper Earth abovementioned, but also to add the three or four remaining Articles, and then properly reduce the whole into a substantial combustible Salt-Petre, fit to make Gunpowder, and for other Purposes suitable to the Qualities that are peculiar to this Artificial Concrete Salt.

This first Product of Nature, in this Concrete, the Hali Nitrum, wherein Nature must be affifted to bring it forth, either accidentally, or by Defign, fuch as the placing of Vegetable or Animal Excrescencies in proper Places for Putrefaction, can never penetrate deep enough into the Bowels of the Earth to mix with the Mineral Waters; for that Generation, which is fo purpofely occasioned, cannot penetrate deeper into the Earth, than

about four Yards. Then it is, in its own Nature, unctuous and greafy, far from any faline Refemblance, and it can no where in the Earth meet with those Ingredients that can render it in any Shape of a Salt Texture. I therefore ask how Sal Nitre can possibly be expected in the Chalybeat or Mineral Waters?

That Salt-Petre is artificial I appeal to publick Enquiry, whether it is not only made in Russia, Prussia, Germany, &c. in very great Quantities, and to very considerable Advantage; but also in the East-Indies itself, from whence it is brought and paid for with ready Money; so that it is a National Deficiency, and Detriment of great Importance, that this Commodity is not made in England, and therefore at least

deferves a publick Enquiry.

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As I have hitherto not brought my Patent into Execution that is granted me from the Government for the making of Salt-Petre, I think it is my Duty to inform the Publick that this Delay is owing to my Enemies, who have taken all possible Means to frustrate this my Undertaking for the General Benefit of the Nation, because it did not immediately coincide with their Interest; and for the Truth hereof I also appeal to a Publick Enquiry, by which it may appear what Pains these Adversaries to the Publick Welfare have taken to diffress me, in order to invalidate my Endeavours, when, if I had not been obstructed in the very Work itfelf, I should have been able, by this Time, to have produced, Weekly, feveral Tons of SaltPetre, as good as any that is imported from the East-Indies; and if this my Assertion can be proved untrue, I am willing to suffer Publick Censure.

But to return to my former Topic, the Sal Nitre in the Chalybeat Waters; it must be here observed also, that such Nitre as generates accidentally, lies never deeper than on the Surface of the Earth; and it is also very well known, that which generates accidentally, is always near, or in fome old Buildings, particularly where the Excrements of Animals are collected. So that it is not reasonable to suppose that this Hali Nitrum, or one Ingredient of the Salt-Petre Compound, can be of any Service to the Chalybeats or Mineral Waters; for if this Hali Nitrum by strong Rains, or any other Means, should be elixiviated, it is not possible that it can penetrate deeper into the Earth than ten or twelve Inches, and therefore utterly impossible to meet with the Chalybeats in the Bowels of the Earth, which is the only Place where this Water Concrete arrives to its full Perfection.

There might be also other Arguments used; as that the Chalybeat Waters spring up in the Mountains remote from, and above the Communication that might flow from Houses, so as to be incapable of receiving any of their Drains into the Mineral Water-Well; nor are any other Materials suffered that can conduce to the Generation of Hali Nitrum in the Limits of these Waters to putrefy, nor are there any Salt-Petre Works erected near the Spring-head of the Spaw-Water: I therefore ask how it is possible

that

or Spaw-Waters in General. 15 that any Salt-Petre can be supposed in these Waters?

But suppose it should happen that any where this Aphro Nitrum did mix with the Mineral Waters, what could they be the better for it? At least we should not have this Water Crystal clear at the Fountain-head, but greafy and dirty: But I know very well that these Gentlemen tell us of, or fancy a natural and compleat Subsistence of Nitre or Salt-Petre in the Principles of these Waters, and not that it has accidentally or in Part slow'd in upon them, which Impossibility will appear evidently to those who shall duely digest and consider this Matter.

There has been a great deal written upon this Subject, and many Authors of Repute, as I have observed, have maintained the Doctrine of Salt-Petre Waters, and Salt-Petre as an Ingredient of the Chalybeats, as a Certainty beyond Contradiction; therefore I shall endeavour to set forth here what it is that has occasioned this

great Error.

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The first Foundation of this Notion is, that when such Waters as contain a Share of earthy or chalky Substance are inspissated in Cover'd-Boilers such as Tea-Kettles, &c. then these terrene Parts separate themselves, and settle at the Bottom, or Sides of the Vessels; and it frequently happens that these Sediments partake some small Share of common Salt, which with the Earth mixed in them taste somewhat bitter, and are thereupon immediately called Salt-Petre; but this Notion is fallacious, for if those Authors had separated the terrestrious Parts from the Salts.

Salts, and crystalliz'd them so as Dr. Short has done, they would find that these Salts were no Salt-Petre, but that they either consisted of the Acid Vitriol, or of the common Salt itself and fine Chalk. And as much as I can learn, these have been the chief Experiments whereby the Salts in the Chalybeat Waters have been examined, notwithstanding the Caution given in this Respect by several eminent natural Philosophers, such as Mr. Boyle &c. so that Dr. Short very justly observes it to be insufficient to examine those Things by the Lump.

Though Dr. Short himself is indeed full of Nitre or Salt-Petre in the Mineral Waters, yet it must be confessed that he is the most exact Examiner of Mineral Water, in this Respect, I ever met with; and though there may be other ingenious Writers, who have not had that ample Experience in Chemistry, as to judge exactly, or have a compleat Knowledge of Salts, yet may they discharge themselves, not only excuseably, but commendably herein, by registering the Variety of their Experiments fo fully, and faithfully, as he has done, that a Proficient in the Art may eafily guess or apprehend the real Nature of them, though under Names and Diftinctions, different from those which have been authenticated and commonly received.

Let us now proceed to that other Ingredient, the Vitriol, which many eminent Writers have afferted to be in the Medicinal Chalybeat Waters. In Answer to this, I say, that there is no where any Native Iron Vi-

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triol, pure by itself, without Copper; because, without some Phlogiston *, it is impossible both for Nature and Art to compose a true genuine Iron Vitriol, without any other Mixture whatfoever; and a Copper Vitriol, I am fure, they will not permit in the Chalybeat Waters, as this Ingredient Copper is manifestly a Poison to all Animal Machines. Then as Nature hath not provided the Iron Ore with the Phlogiston, in the Bowels of the Earth, it must be supplied with it in every Shape by Art, and therefore when we will produce an Iron Vitriol, we must take old Iron for this Purpose, which is provided with the Phlogiston; though it is partly destroyed again in the Solution, or Manufacture of the faid Vitriol. I therefore ask, how, in these Circumstances, an Iron Vitriol can be expected in the Chalybeat Waters?

I do not deny a Native Vitriol, and even fuch as is for the most Part of Iron; but there are none which do not contain so much Copper, that it is impossible to make any Medicinal Use of them, not to mention the other Ingredients, which these Native Vitriols

^{*} The Word Phlogiston was first introduced into Metallurgy by Dr. Stahl; who calls it, Causa Metalleitatis Malleabilitatis, ductilitatis, et splendoris Metallici. A l'Ordinaire, Orogioù, which signifies as much as Principium Instammabile. Doctor Becher, very skilful in true Metallurgy, upon which Dr. Stahl surther improved, reduced the two Ingredients of the Metals into three Terra Principales; as Terra Mercurialis, is Terra Prima; Terra Instammabilis, is Terra Secunda; and Terra Vitrescibilis, is Terra Tertia. And according to this System, which is confirmed by Experience, as these Terra Principales happen to meet and mix, so the Metals or Mineral Concretes exist, even Bitumens, Salts, &c. &c.

commonly contain, which render them also unserviceable in Medicine. But these real Vitrioline Waters are no where to be met with, but where the Bowels of the Mountains are exceeding rich of Sulphur; and these Waters are extream sharp and corroding, infomuch that the Miners are obliged to preferve themselves in such a particular Manner from their ill Effects, as not to receive any Hurt by them. Such are the Waters that really contain Vitriol, and not the Medicinal Chalvbeat Waters; but fome Criticks of those Vitriol Waters, when they condemn the fame for Medicinal Use, think it sufficient Distinction to fay, "That they contain too gross " a Vitriol Salt, which is not homogeneous " to the Animal Oeconomy." Which in my Opinion is but an Expression, according to the Mysterious Art they profess, that gives no fatisfactory Explanation of the Matter in Question.

If there was any real Vitriol in the Mineral or Chalybeat Waters, it must have appeared somewhere; yet several have inspissated these Waters according to Art, and by these Means crystallized the Salts they contain; one would think that by these Operations at least there might have remained a small Part of this so much talked of Vitriol in the Crystallization. It is true that Dr. Short calls some of his printed Crystals by the Name of Vitriols, but I am afraid that upon Examination they would not be found to answer, in their Nature and Properties, to those which

which may appear in Vitriol. And I do not remember any of the other Authors who have thus anatomized, or distinctly investigated the Nature and Contents of Chalybeat Waters, who have pretended to produce Vitriol out of them, but, on the contrary, have ingenuously confessed they could not do it. The Reason they give for this their Disappointment is, that their pretended Vitriol is so volatile, that it is impossible to produce it corporeally in any Shape whatfoever. Now I appeal to the Judicious, whether it is not reasonable to question, if the Matter in Debate is so volatile, or spiritual, that it can in no Shape be made fensible, or perceptible, how they can judge of its Nature and Quality?

The Foundation which they build their Conclusions upon, that there is Vitriol in the Chalybeat Waters, confifts in the Property they have of turning Galls and feveral other Vegetables into a Purple Blue Colour. And this Discolouration they attribute intirely to the Vitriol, without which they also say that there can be no Colour produced. But how wrong they are in their Judgment, the following Experiment will prove :- " Take " Iron Vitriol, dissolve it in common Water, " fo much as to bring it as near to the Taste " and Strength, as possible, of that Chalybeat, " against which you try it; then try this " Solution with an equal Quantity of Galls, " and Mineral Waters, against one another;"

and in this Experiment you will find, That,

with the Chalybeat Water, you will not be able to produce any other Colour than deep Purple, but the Galls will at once, without any Variety, turn the Solution of Iron into a deep Black; and if there was a real Iron Vitriol in the Chalybeat Waters, it would without Doubt do the fame as in the Solution of Vitriol, without any Intermission whatfoever; and this may be enough to say here upon the Non-existence of Vitriol in these Waters.

I will now address myself to the Gentlemen who deny that the Air is an Affistant in the Composition of Mineral Waters. They affure us that every Thing, which the Chalybeat Waters as well as the warm or hot Baths contain, is produced by the fubterraneous Fires, and therefore that they are very nearly related to one another. The Spirits or the volatile Acids in the Chalvbeat Waters are. according to this System, in the same Manner produced by Nature, as the Chemists make their strong Waters, such as Spirit of Salt, or Nitre; and the Phænomena that are produced of an equal Quantity of Filings of Iron and Brimstone must be the Occasion: or the fubterraneous Fires are inflamed by these Matters, and so they boil, distil, alkalize, sublimate, &c. as a Chemist in his Laboratory: In short that every Thing is performed, after this Manner, Mechanically by Nature in the Bowels of the Earth, according to the contracted and imperfect Proceedings of Art.

But, as to the Mistake of these subterraneous Fires, I will shew more at large in the next Chapter, that they can have but very little Share in the Production of our Medicinal, and none, in the Existence of the Chalybeat Waters; because that will be a more suitable Place to discuss this Point, as I shall there treat of the hot Waters by the Ancients, called Thermæ, and shall here intirely confine myself to the Air, and what Share the same has in the Product of the Chalybeat Waters concrete.

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But, before I proceed any further, I shall be glad to fatisfy an ingenious Author who feems to doubt the same, that there is an Acid in the Air which is not improperly called Acidum Vagum; and for the Proof of this I would offer the following Experiment: " Take any Alkaline Salt, that is pure, clean, " and void of any Acid, or other Mixture " whatfoever; expose it to the Air, in a Gar-" ret, or other Place that is dry, where no " Damps, Vapours, or Sun can come to it, " but the Wind or Air may fully work upon " it; and when this Alkali has lain about an " Inch thick, it will in the Space of five or " fix Months Time, without any other Mix-" ture, and only by the Contributions of " the Air, generate into a perfect Tartarus "Vitriolatus." Now the Question is, From whence this Acid is derived, and if it is not manifestly imbibed from the Air into the Alkaline Salt? Then it is very well known, that the Alkaline Salt can in no other Manner

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transform itself into the Vitrioline Tartar, than by the Help of a strong Acid Vitriol; and in my Opinion it admits of no Doubt but it is conveyed into Alkali by the Air, from the same Acidum it naturally possesses: For the Truth of this I appeal to the Experiment or Trial itself.

I could give many Experiments more, how to attract the Acidum out of the Air, but I take the above-mentioned Example to be fufficient for a convincing Proof that not only all living Animals, who breathe upon this Globe, daily receive this Acid from the Air, but also the Vegetables themselves partake of it, as is particularly demonstrable in the Fern, Polypody of the Oak, all green Shells or Te-

guments of Fruits, &c.

But to return to the Matter in Hand: I will relate here fome Instances, from whence it will evidently appear, that the Air has not only a Share in the Mineral Water Product, but also in all Mineral Concretes; and is instrumental to their Changes in the Earth, as far as they are subject to them: From whence I shall have also an Opportunity to relate my Conjectures in what Manner the Air may be supposed to contribute to the Medicinal Waters.

On this Head we ought to confider, that though the Metals, Mineral Concretes, or Fossil Bodies in the Bowels of the Earth, were, at the first Creation of the World, ordained and mixed in that Compound, which is necessary to constitute such Metallic or Mineral

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Mineral Bodies they refemble; yet, at the same Time, it is possible, by an artificial Maturation, to elevate Metals and Minerals, and to improve them confiderably in their Splendor and Magnificence: And we are affured that Nature is not less behind-hand in this Respect, than the Mineral Fumes in the Bowels of the Earth are fully imbibed with the Phlogiston, as the Causa Metalleitatis; and it is also known, that the same is highly ferviceable to heighten the Minerals in their Splendor; as it is likewise the true Case hereof.

For the Truth of these Affertions, I refer myself to the skilful Metallurgist for the artificial Maturation to improve the Metallic Splendor. As to the Mineral Fumes, that they are inflamable, is fufficiently known; and even fo substantially preservable for this Purpose, that they are collected in Bladders in the Coal-Pits two-hundred Miles distant from this Metropolis, and brought hither to the Curiosi; and, when the Bladders are opened near a Fire or a Candle, those Fumes will immediately catch Fire; which both discovers of what Nature they are, and that they are ferviceable to heighten the Splendor of the Minerals or Ores they encounter in the Bowels of the Earth, is confirmed by daily Experience in the Mines. But when it happens, by the Discovery of a Mineral Vein, that has received a Share of these Fumes, that the Ore upon Trial proves poor in Me-C 4

tal, then a skilful Miner orders it to be shut up again, as not having had its due Ventilation to concoct it till the interfering or transpiring Air has had its prevailing Operations upon these Fumes; and as in such Veins there is supposed to be a sufficient Share of Vitrisying Earth, daily Practice confirms, that, in a short Space of Years, the Metal in those closed Veins will prodigiously increase.

It is evident that, 1. These cannot be the Product of Fire; because, where they meet with Fire, they burn. 2. That these Fumes are the Product of a Mixture, seems to be proved by Experience. 3. That there can be no Mixture without Motion; and 4. No Conveyance of Matter, without an expulsive or dispersing Power. It is therefore reasonable to suppose, that the Air, here, is the chief Agent, both in moving, constituting, and conveying, or dispersing these Fumes through the Bowels of the Earth; which sufficiently proves itself, by the great Affinity, Affection, and Readiness of the same, in uniting with the Air.

To prove that these Fumes are the chief constituting Parts of the Medicinal Mineral Waters, and that the Air is not only highly serviceable, but also a necessary Adjunct, or Agent in the Composition thereof, without the Assistance of the subterraneous Fires, I have a modern Instance before me, which is related by Dr. Hoffman, after the first Account given thereof by Lic. Andrea, as follows, viz. That a Chalybeat Well in the Duke-

dom of Wirtenberg, in the Kitzingerthal, that was for many Years of great Virtue and Efficacy; but, all on a fudden, it lost its good Qualities. The Reason of this Change was found upon Enquiry to be owing to some Stone-cutters, who, digging for Stone near this Well, had accidentally broke through a Cavity in the Rocks, out of which iffued a strong Mineral Fume. By this Opening, the Course of those Vapours being diverted, the Water was deprived of its efficacious and sovereign Supply. Hereupon it was immediately ordered that this Cavity should be carefully closed; and soon after this Chalybeat recovered its good Qualities again *.

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I have another modern Instance of the same Nature, which is related by the ingenious and most learned Dr. Seippius, the present Physician at Pyrmont in Germany; under whose mature Directions, the Waters of this Place are administered. This Gentleman lately obliged the World with a new History of the famous Pyrmont Waters; in which he gives us, Page 48, the following Account: "That, about eight-hundred Paces

^{*} This Chalybeat Water Fountain, where this Accident but lately happened, is of long Standing, and was, in the Reign of Queen Mary of England, in great Repute. For then Dr. William Turner, an Engliftman, who was an Exile in Germany, in this Queen's Reign, takes Notice of this Chalybeat in his Book of The Natures and Properties, as well of the Baths in England, as of other Baths in Germany and Italy, annexed to his Herbal, printed, the last Edition, at Coln, Folio, 1568, Page 4. And he intitles the same, The four Bath, in the Dukedom of Wirtenberg: In those Times the Chalybeats are frequently called Baths.

" distant from that excellent Mineral Water-"Well at Pyrmont, the Labourers, who " break or dig Stone in the Rocks, were fre-" quently drove away by the Mineral Fumes " that exhaled out of the Cavities thereof; " and that he once, near the Breaches made " in the same Place, found many dead Ani-" mals, as Birds, Mice, Snakes, &c. whom " he very justly presumes to have been suf-" focated by the Mineral Vapours which ex-" hale out of these Rocks." And, Page 79, he tells us, "That, when this famous Chaly-" beat Water-Well is near exhausted, then " the People, who will draw Water out of " it, become intoxicated by these Mineral " Fumes; and when, at this Time, Geefe, " Ducks, Fish or Frogs, are thrown into " the Well, they die immediately of these "Fumes." From hence it is evident, how richly the Pyrmont Waters are impregnated with these active Mineral Vapours; or else it would have shared the same Fate with those above-mentioned in the Dukedom of Wirtenberg: And these may be sufficient Proofs of the Air's having a confiderable Operation in the Production of these Medicinal Waters. It is indeed frequently fuggested that there is an Universal Acid which exists, or is originally generated in the Sea, or great Ocean of the World; and that from thence this Acidum was attracted into the Bowels of the Earth, by the fubterraneous Fires: A very furprifing Attraction indeed! by which Doctrine, they bring in the Sea,

or Spaw-Waters in General. 27

or common Salt, as a constituting Part of the Chalybeat Waters. I do not deny that there are feveral Medicinal Waters that contain common Salt; but the grand Mistake lies here, that the Vitrioline Acid, which is generated in the Bowels of the Earth, is the Universal Acid; and the Acid, which is contained in the Sea Salt, is actually, from its Origin, an Acid Vitriol. And it feems also to be more confistent with Nature, that the Sea Water receives its Salt Mixture from the Globe or Earth, than to suppose a Generation of it in the Water: Tho' it may possibly alter, in some Respect, the first Texture, by the Motion of the Sea: But however, this Alteration cannot be called an Origin, or Generation.

For the Truth of this my Affertion, that the Acidum Vitriol is the Acidum Universale, and that its Birth or Generation is in the Bowels of the Earth, and not in the Ocean, I must refer the Judicious to the most learned Drs. Stabl's and Neuman's Writings, wherein, is sufficiently, and even fuperabundantly, by Experiments proved the Truth hereof. But fince it would enlarge this Work too much, to infert them here, it may fuffice to instance that very well known Experiment, to prove that the Acidum in the common Salt owes its Birth and Exiftence to the Vitrioline Acid: viz, That when common Salt is smelted with the simplest Phlogiston, that is destitute of any Salt or Acid, then may some Brimstone and even a little Vitriol be thence produced; an Experiment so well known and fo fure in its Kind, that it will not admit of of any Doubt whatsoever. Thus far of the erroneous Doctrine; I will now proceed to what I have found the Mineral Waters contain, by Experiments, and how their Generation or Origin may most rationally be accounted for.

All Medicinal Mineral Waters differ so much from each other, that it hardly is possible to find two of these Springs that are, in every Particular, of Taste, Weight, Salts, Spirits, Quantity, &c. equal; but, on the contrary, that in one Property or other, some perceptible Difference is to be found in every one of them; for though many, and especially the Chalybeat Waters, may contain a great Equality in them, or have the same Ingredients, yet are they so irregularly dispersed by Nature, that an exact Distinction of

each of them cannot eafily be made.

Notwithstanding all these nice and distinct Differences, we may divide the Medicinal Waters, the Thermæ or warm Baths excepted, under five capital Titles, viz. 1. Chalybeat Waters that are come to some State of Maturity, and have been so duely digested in the Bowels of the Earth as to bear Exportation; fuch as the Pyrmont, and the Pouhon Spaw. 2. Chalybeat Waters that lose their Texture, and become dirty or feculent in a short Timeafter they are exposed to the Air; fuch as the Waters at Cleve, the Geronster Spaw, Schwelm, and other Places in Germany, and doubtless also here in England, which bear no Exportation. 3. Chalybeat Waters that have plentifully imbibed an Iron Earth, and do not contain any purging Salts, but are in their Operation as a Crocus Martis adstringens, which strengthen

strengthen the Stomach, and are very beneficial in fuch Diftempers, where Medicines prepared of Iron are fafe to be administered: These Waters are very falutary in Artificial Baths, fuch as the Tunbridge Wells in Kent, those at Islington near London, and some Springs discovered by me near Holywell in Flintshire; also the Radebergishe by Dresden, and many more. 4. Chalybeat Waters that contain a bitter purging Salt; which are very beneficial in Dropfies; fuch as I take to be the Scarborough in Yorkshire, the Epsom in Surry, the Sedlitzer in Bobemia, and others. And 5. Such Medicinal Waters as the Selter Water; which is a rare Concrete, and I have neither met, or heard of the like any where else, but at Selter, of which I shall more copiously discourse in the Appendix hereunto annexed. To these I may add a 6th. which is also a most rare Mineral Water Concrete, and which I have never met with the like elsewhere; I mean that at Shadwell near London; I cannot very well range it under its proper Head, but to express it most fignificantly I would call it an Hermaphrodite between the Acidulæ and Thermæ, whereof I shall be more particular in a proper Place.

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But as those Chalybeat Waters, that are defcribed under the second Article to lose their Texture soon after they are exposed to the Air, are the most universal, and the most suitable to most Constitutions and Distempers, I will therefore intirely confine myself here, in this Part of my Treatise, to them; and therefore at this Time, to avoid Prolixity, dismiss all the others,

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except the Tunbridge Chalybeat Waters, which are in Kent; those at Islington, Shadwell, and Holywell, especially remarked by me; and therefore I shall take particular Notice of them in

their respective Chapters.

It is already observed that the Iron Earth is the Matrix in which the Vitrioline Acid is generated; but yet it is a known Truth that neither all Iron Minerals, nor the fame at all Times, are provided with this Acidum; for fo, all our common Waters would be partly Chalybeat Spaws: Befides, there are hardly any common Waters used, which have not in some Part or other of their Passage had an Intercourse with Iron Minerals, and yet we see they do not partake thereof, or if they do, are deemed to be unfit for common Use. But when a Chalvbeat Water arises, then it must meet with such an Iron Ore Vein, that contains a small or moderate Quantity of the Acidum: And when this is mixed with the Iron Ore Vein, the abovementioned Mineral Fumes or Vapours must also be imbibed and concentered in this Water; and then the Chalybeat Spaw is complete. Nevertheless, when it meets with the Acidum too plentifully, it is thereby rendered useless for a Chalybeat Spaw.

These Mineral Fumes may be supposed to exist in this Manner: As it is evident by many known Circumstances that the Air penetrates through all the Globe, and is frequently met with in Mines; when the Air meets with that Sublimate, which Basil Valentine calls the Seed of Metal, but I call it the Metallic Nutriment which is in a foft State, just like Butter of Antimony,

or Spaw-Waters in General. 31

Earth, then this Matter is brought by the Acidum in the Air into Agitation, by which it receives more Mixtures of Bodies and Additions. Then the Fumes, as the Quintessence thereof arises, are conveyed through the Bowels of the Earth by the Air, and this ascends in some Places

more abundantly than in others *.

For the Truth of this my Affertion, I have an Experiment that is convincing; and can with that Sublimate itself produce these Mineral Fumes or Vapours in every Respect, and may boldly here affert that I know the said Sublimate, and am in a great Measure acquainted with its Nature; but as I have not yet met with any body in this Kingdom who have any Knowledge thereof, I will for certain Reasons forbear to mention both the Name of it here, and the Manner how the same is to be collected in the Mines.

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^{*} The famous Dr. Teichmeyer, Professor of Physic in the Univerfity of Jena, relates an Experiment performed by himfelf, which proves the great Power of the Air and the Acidum therein contained, viz. That he hath taken Filings of Iron, and exposed them without any Addition to the open Air, Rain, Snow, Sun and Moon Spine; which reduced in a Year's Time these Filings into a Crocus, which he washed very clean and levigated to a very fine Powder. This he exposed for a Twelvemonth longer, in the Manner as before, to the Air again; then he put it into a Retort, without any Addition whatfoever, and diffilled it gradually through all the Degrees of Fire. When this was done, he found, in the Neck of the Retort, a black greafy stinking Materiam Viscosam et quasi Butyrosam, a slimy Substance, like Butter, in which was contained a good Portion of Quick-filver. 'This Experiment, which I could corroborate with many Inflances that are correspondent therewith, evidently proves that the Air has Power with the primogenial Acid therein contained, without any other Addition, to open the Iron fo that it shall yield its Mercurial Contents.

These Mineral Waters, whereof I treat, are never without a Neutral Salt, which may be supposed to form itself in this Manner, viz. These Spaw Waters are frequently impregnated with the Alkaline Earth of the common Salt, or the common Salt itself. This Alkaline Earth attracts as much of the Vitrioline Acid as it can, and fo constitutes the Neutral Salt, which is not any ways different in its Nature from the Sal Mirabile Glauberi: Or if destitute of this Alkaline Earth, and it contains no common Salt at all, then it happens fometimes that a groffer Alkaline Earth, as Chalk, &c. is contained in the Spaw Water Mixture, and this constitutes the Neutral Salt, in the fame Manner as is related of the Alkaline Earth of the common Salt; and fometimes these Neutral Salts are composed of the Acid, and the most minute Particles of the absorbent Iron Earth. But all these Salts are of one and the fame Nature, and answer the same End or Purpose; and if there is any Difference in them, it confists in the Purity; some being cleaner and lighter than others. And those Chalybeat Waters are the best and readiest in their Medicinal Operation, where the last mentioned absorbent Iron Earth is the Basis to the Neutral Salt it contains.

That the Mineral Fumes contain a good Share of the Phlogiston is without Dispute; which imbibe or impregnate the Chalybeat Waters also, and the more they are imbibed with the Instammabile, the more volatile it renders these Waters, and the more powerful and penetrating they are rendered

or Spaw-Waters in General. 33

rendered on this Account in their Medicinal Ef-

ficacy.

To prove that the Chalybeat receives and partakes of the Phlogiston, I must relate here the Incident, that befel that most excellent Medicinal Water-fountain in the Lordship of Cracow, in Poland; which was some Time ago set on Fire by Lightning, and by this means occasion'd confiderable Damage to the adjoining Forests, not being extinguished without great Difficulty. This Fountain may be kindled or inflam'd at any Time, with a Candle or Flambeaux; but it is remarkable, that if the Water is taken out of the Well, and removed at a small distance, it cannot be fet on fire by any means whatfoever. The People, that live in the Neighbourhood of this Salutary Medicinal Spring, use this Water as their common Medicine, and indeed they enjoy a perfect State of Health, to an incredible Age. This fingle Example may be fufficient, for the Support of my Arguments in this respect; though I could relate feveral Methods, whereby the Phlogiston in the Chalybeat Waters can be made patent or clear to the Senses.

When in the Manner aforesaid, the Medicinal Waters exist, then the Acid becomes invigorated or sharpen'd by the Phlogiston, contained in the Mineral Fumes, and it dissolves the finest Parts of the Iron Earth; which Solution is at the same Time attracted and united by this Principium Instammabile, and incorporated in this Water Concrete; which Iron Earth is an excellent Crocus Martis Aperitivus, the most salutary Medicine in most Chronical Diseases. It is very

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observable that this Iron Earth or natural Crocus Martis Aperitivus is rendered quite limpid, or clear as Crystal, and is not in any degree to be discerned in the Water, otherwise than by the Taste only; but, as soon as it loses its Commander the Phlogiston, it separates itself immediately from this its Aquatic Concorporation, and sub-

fides visibly in its Substance.

The Neutral Salt receives also a Share of the Phlogiston, which remains therein, even when feparated from the Waters; and, for the Truth of this, I appeal to a proper Experiment for its Discovery. But this Salt receives not so much. or is not of itself so much contained in this fort of Chalybeat Waters, as to refult its Destruction, or prevent the Iron Earth from Subfiding, when exposed to the Air. And upon the whole. according to this Examination, we may determine, that the Mixture of these Chalybeat Waters or their true Compounds are, 1. Iron Earth. or a Natural Crocus Martis Aperitivus. 2. A Volatile acid Vitriol. 3. Sal medium fixum, or a Neutral Salt. 4. The Phlogiston, or Principium inflammabile. And 5. Common Water: And this is all that hitherto could possibly be discovered in these Medicinal Waters.

CHAP. II.

The Origin or Generation of Natural Hot Baths confidered, with the Artificial Chalybeat Baths compared, and their Power and Efficacy upon the Human Machine examined.

HERE have been, in my Opinion, many erroneous Doctrines concerning the Hot Baths (by the Ancients called Thermæ) as well as concerning the Chalybeats, advanced to the World; as I have evidently made appear in the former Chapter: Yet it must be confessed, that there have undesignedly slipped from those Authors, that have wrote on the Medicinal Waters, more Hints of their true Origin than has as yet ever been advanced of the Properties of the Chalybeats or Acidulæ.

I shall not now examine the different Opinions, that have prevailed, or state them here; as being too foreign to my present Design: but shall only consider here the grand Notion, so universally prevailing in the present Age, concerning the Origin of the Thermæ; and treat this Notion in my usual Manner, as the Nature of the Subject will admit.

According to the received Opinion, the Origin or Generation of the HOT WATERS is supposed, in our present Times, to be occable to be present to be occable to be present to be occable t

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fioned by Subterraneous Fires; which not only, agreeable to this Notion, occasion these Waters to continue boiling, through a constant and equal Heat; but they also assure us that these subterraneous Fires, with their Smoke, convey to these Waters the Mineral Ingredients or Particles they contain; and as the Acidulæ or Chalybeat Waters (which are cold) are fometimes found in the Boundaries or Neighbourhood of these Hot Baths; they are also, according to this Doctrine, a Produce of the same Cause, and their Spirits and Mineral Ingredients are conveyed to them by the Smoke of these Fires, as aforesaid; and by these means they bear a near Affinity to the Medicinal Hot Waters.

They tell us likewife, that these Subterraneous Fires exist, and are supported from Iron and Brimstone meeting together in the Bowels of the Earth, which, being moistened with Water, first create a Heat, which Heat by Degrees becomes a burning Fire itfelf. For the Truth of this their Affertion, they give us the following Experiment, by taking one Pound of Brimstone finely powdered, and adding an equal Quantity of small Filings of Iron, which being moistened with Water, and worked together into a Confistency like Paste, is put into a Glass for the Space of twelve Hours, which occasions so great an Ebullition, that the Glass bursts, and from its original Colour becomes black; and the Heat being so intense, it hardens the Matter, which before was foft, like Paste; and

and Artificial Chalybeat Baths. 37

and when broke into small Pieces, and exposed to the open Air, the Heat becomes so powerful, that it bursts into a violent Flame. The Veracity of this Experiment is not to be doubted, but yet I absolutely deny the Conclusion, which they infer from it, viz. that this is the true Cause of the Medicinal Water's Origin or Generation, from the follow-

ing Reasons.

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But, before I proceed to offer my Arguments against this erroneous Doctrine, I cannot omit making Mention, that Mr. Lemery, the French Chemist, some Time ago, prefented the ROYAL SOCIETY at Paris with a Differtation, in which he pretended to prove, that, in the very fame Manner, as these Gentlemen affure us of the Occasion and Origin of fubterraneous Fires, Earthquakes are caused, and produces the above-mentioned Experiment for the Support of the Doctrine he advances; fo that, if we allow him to be in the right, and acknowledge that the same Cause is the Origin of the hot and cold Mineral Waters, as these Gentlemen would perfuade us, then it will follow, that these our most excellent Medicinal Waters are the most liable to Destruction of any Thing I know; but I never, as yet heard, of any Medicinal Water Spring, that was destroyed by an Earthquake. But to proceed,-

My Reasons and Arguments, that the Subterraneous Fires cannot possibly be occasioned by such a *Mixture* (as these Gentlemen pretend to prove) are as follow: (1.) Nature never produces a compleat Iron itself, but only the principal Part of it, which is vulgarly and improperly called Iron Ore, out of which, Iron cannot be produced without the Phlogiston; (to which Wood-Coals are commonly used) and if it is put into a Smelting-Furnace without it, it vitrifies in the Fire without the least Resemblance of Metal. (2.) That Experiment, which they affure us of, requires a compleat Iron, and cannot possibly be performed with the best Iron-Ore. (3.) Therefore as Nature is not furnished with a ready made compleat Iron, which is absolutely requisite to produce the Fire, which they represent; How then can it with any Propriety of Reason be supposed, that the Subterraneous Fires are occasioned in this pretended Manner, when Nature is destitute of the principal Matter, that must occasion the Fire? (4.) In Case Brimstone meets with Iron Earth, we find that they are fo homogeneous together, that they cannot possibly occasion an Ebullition, Effervescence, or any Heat whatever; then, as the Iron Earth is destitute of the Phlogiston, it unites and incorporates per se, and by these means somewhat affifts the Metallification, though not able to compleat the fame; and this is the Reason that we never meet with pure Sulphur by the Iron Ore, as we do by Copper, or other Metallic Ores; the Hessian Minera Martis Solaris, and many others of the same Nature, prove this my Affertion indisputably. (5.) In the Experiment for the supposed Product

and Artificial Chalybeat Baths. 39

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duct of the Subterraneous Fires, we are directed to observe a nice and careful Exactness, such as Quantity, Purity, Mixture, &c. &c. without which this Experiment will not fucceed: fo that if Nature (we will suppose) was provided with a compleat Iron, it cannot be imagined, that this requisite and strict Exactness can be performed, or such an Æquilibrium of Matter can be observed in the Bowels of the Earth; and therefore upon this Confideration, it will appear, that these Fires cannot exist, as are represented. (6.) Suppose again, that the Medicinal Waters do affume their Origin or Birth from Subterraneous Fires, it will inevitably follow, that thefe Waters will never appear to us in any regular State; but will at some Times, and on fome Occasions, be stronger or weaker, and continually liable to feveral changing Circumstances more, because Fire, and every Thing that hath an immediate Dependence thereon (as in this Case the Medicinal Waters must have) are naturally subject to an unavoidable Irregularity. This my Affertion is constantly proved by the burning Mountains, which frequently alter their Conditions, and never remain in one Regularity. (7.) Therefore if this was the Case, we could not expect any Continuance of the Medicinal Waters. Then again, how many Burning Mountains are known, that are extinguished, when the combustible Matter is intirely confumed and destroyed? Which would consequently be the Cause of the Destruction

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imagine, that these Waters do owe their Origin to Subterraneous Heats. (11.) Again, suppose, that these Medicinal Waters were occasioned from the above-mentioned Causes, it would follow, that all these Waters would inevitably contain in them a fmoaky, fetid Taste; since they affert that the Mineral Parts that these Waters contain, are imbibed by the Damps of the Fire; but that they do not contain in them a smoaky Taste, is too well known, to contest the Truth of. (12.) Fires, which these Burning Mountains contain, properly speaking, are not real Subterraneous Fires, as being not locked up and confined under the Surface of the Earth: But fubterraneous Fires, properly understood in their strict Sense, are those Fires that we are to suppose to be confined in the Center of the Globe or Earth, and therefore cannot reasonably be imagined to be of any Assistance to the Production of our Mineral Waters or Fossils.

This may fuffice, to convince us, that Medicinal Waters cannot derive their Origin from

these pretended Subterraneous Heats.

There is also this Notion prevailing among the Learned, that these Hot Waters contain in their Principles, Nitre; or that Nitre is a Principle of these Waters. It is true, and cannot be confuted, but that Nitre greatly partakes of the Principium Inflammabile; but this is not a Reason sufficient to prove, that it can therefore be of any Service or Assistance to this Medicinal Water Concrete, or is by

by any means able to convey the Inflammabile into the Water, fo as to cause an Alte-

ration of Warmth, or violent Heat.

I have, in the first Chapter, clearly proved the Non-Existence and Impossibility of the Nitre in Medicinal Mineral Waters; fo that it is needless to dwell longer upon that Subject here. But, however, I cannot omit obferving to these Gentlemen, that if they will please (for the Sake of Self-Conviction) to add Nitre in the Mixture of the Experiment above-mentioned (wherewith they endeavour to prove the Existence of warm Waters) they will not only find, that it will baffle their Experiment, but also produce another Concrete foreign to their Intention; or if Nitre is added to warm Water, produced by this Experiment, or a natural Bath Water, they will find fuch an Alteration in it, as will render them confiderably different from their original Quality; which I think fufficient to prove, that Nitre cannot be a Principle of these Waters, or by any means capable of promoting the Generation or Existence of the fame.

Among all the Writers of this Age, that I have been conversant with, a certain learned Gentleman of the Faculty in this Nation has, in my Opinion, offered to the World the nearest Hints of Truth, that I have as yet met with; and it is a great Misfortune to the learned World, that he has not fully explained himself, and given us his real and firm Opinion of the true original Caufe, that

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and Artificial Chalybeat Baths. 43

creates Heat or Warmth in these Waters, in the Bowels of the Earth; but has, in my Opinion, rather attributed it to many, and more

than two Principles.

Dr. Sympson has, in my Judgment, many Truths in his Book, and is not deserving of that ill Treatment, which he has met with from fome Gentlemen of the Faculty in their learned Works; yet it must be confessed, that he is very erroneous in his Opinion of the Origin and Existence of the Hot Waters, because in his Hydrologia Chemica, Page 154, he agrees with Kircher, that these Hot Waters are boiled in the Bowels of the Earth, by the often mentioned Subterraneous Fires; but yet he appears to be a Man of found Judgment, fetting afide his Sanguine Temper and Partiality, which appear too vifibly in his Writings against his Antagonist; he seems to be convinced, that this Subterraneous-Fire Doctrine cannot be univerfally embraced; but allows that fome of these Waters may be occasioned by these Fires, and others by Calx Viva, which, in my Opinion, is a Doctrine as erroneous as the former *.

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^{*} If Authors had clear or distinct Ideas of the Subject they treat of, or were duly possessed of it, they would not fall into such an Inconsistency, as I here quote of Dr. Sympson, who, after his Publication of Hydrologia Chemica, in which he admits, amongst the Causes of the Hot Natural Baths, the Subterraneous Fires, in another Treatise of his, called Zymologia Physica, appeals to (N. B.) his own identical Book Hydrologia Chemica, for Evidence of his having exploded this Notion, and closes with Dr. Jorden's Opinion of their being occasioned by the Fermentation of Mineral Juices, though he differs with him as to the Fermenting

On Natural Hot, CHAP. II. There is again a Notion very prevailing

Fermenting Contents. This Dr. Jorden wrote, early in the Reign of King Charles the First, a valuable Discourse of Natural

Baths, and Mineral Waters.

But the above-mentioned Inconfiltency, for Caution fake, I here infert in Dr. Sympson's own Words, Hydrologia Chemica, Page 154. Some other Causes there are of Hot Springs, viz. Subterraneal Fires, fet on Work by the Flagration of Bitumen, or Sulphur; which being kindled in some Parts of the Earth, where being close pent up, not finding Vent, causeth Earthquakes; but when it breaks forth, it fometimes forceth with that Violence, as that, if it break forth under the Sea, it throws up Stones and Earth in fuch Abundance, as that a new Island is thrown up of a sudden in the Midst of the Sea; and that, for Many Leagues together, the Sea is at that Time covered over with the spungy Pumice-stone, which is the Caput Mortuum in the Flagration of that Mineral. Other Places there are, which, as Chimnies or Flews, the Subterraneous Fire finds Vent in, as

Ætna, Vesuvius, Strongilo, Vulcano, &c.

These Subterraneal Fires the ingenious Kircher, in his Mundus Subterraneus, calls Pyrophylacia, which being conveyed by feveral subterraneal Pipes or Channels to those Cisterns or Receptacles of Water, called Hydrophylacia, which thereby become heated, and that in Places not far from Day, I mean the Superficies of the Earth, breaks forth in hot Springs. These Pyrophylacia, it is very probable, are the Cause of some Hot Springs, as the Kindling of Calx Viva are of others. And in his Zy-MOLOGIA PHYSICA, or Philosophical Discourse of Fermentation, Page 19, 20, 21, viz. Amongst the Causes assigned by divers Authors of the Heat in Natural Baths, those of Subterraneal Fires are not the least, which because we have by sufficient Arguments at large, exploded in our Hydrologia Chemica, shall now therefore wave: But the great and most authentic Opinion is, that of Dr. Jorden, in his Book of Natural Baths, which by many learned Persons, hath (and that not unworthily) the kind Acceptance, and the most general Applause, which is grounded upon a Fermentation from a Seminary Spirit of Minerals, in the Bowels of the Earth, meeting with convenient Matter, from which Spirit acting upon the Matter in Generation of Minerals, is caused that Heat which perpetuates Hot Baths.

It would be too tedious a Task, for this intended short Tract, now to wade into a deep Examination of the Hypothefis of this learned Man; I shall only fay (leaving the rest of that Doctrine in its own Worth) that had that judicious Person been better acquainted with the Understanding of the true and genuine Sense

and Artificial Chalybeat Baths. 45

among another Party of Gentlemen, which would perfuade us to believe, that these hot Waters are occasioned in the Earth by Fermentations.

Dr. Jorden, though he is one of the Par-

of Fermentation, he would, no Doubt, have polished his Notions much better, than we find them; and would have told us whereever Fermentation was found (in whichfoever of the Triplicity of Nature's Kingdoms) that there necessarily must concur the Principles of Fermentation; and that Sulphur, or Bituminous Matter (being a-kin to Sulphur) must be one of those Principles, as to the Mineral Kingdom, and consequently be an indispensable Ingredient in all Hot Baths: For Fermentation can no more exist without its own Principles, than Fire can without Combustible Matter (or the Principles of Firing) nor than Animal Bodies can be sustained without their peculiar Ferments, which, what Analogy these, viz. Vegetable and Animal Juices in their Fermentations, as to their constituent Principles, bear to those of Minerals,

we may elsewhere give an Account.

Only here we shall take Occasion to answer that grand Objection, the aforesaid ingenious Author makes against Sulphur being the Cause of Heat in Baths: For though we do not affert, that Sulphur, fingly considered, is the Cause of Fermentation or Heat, but that it is one of the Principles of Fermentation; yet we judge that Objection toucheth upon the Verge of our Hypothesis, and is therefore worthy of our Solution. The Objection is, I hat if Sulthur can give actual Heat to our Baths, it must burn; the like he faith of Bitumen, that, unless it be kindled, it can yield no Heat to our Baths. I answer, That hereby it is obvious, that the aforesaid Author did not thoroughly understand the true Efficients of Fermentation in Mineral Juices; for if he had, the Question had been beyond Dispute; for though Sulphur or common Brimstone, in its concrete Substance, is not the sulphureous Principle Nature useth in the producing of Fermentation in the primary diffeminate Juices, where fuch Things are in Embryo, or in Solutis Principiis; yet even that very concrete Body, whether in the Form of Brimstone, or complicated within the Texture of other Minerals, Pyrites, &c. is by the Supervening of a powerful Acid, capable of Fermentation, and thence of imparting its more subtile Apporrhea or Stream (by the Comminution of the aforesaid Fermentation) and susceptible of the Virtues hereof: So that it appears, that Sulphur may be one of the Efficients of Heat in Baths; and yet its Flagration not requifite at all: The same we may safely say of Bitumen.

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tizans of Fermentation, must notwithstanding retain his due Praise and Value, for having exploded many grand Errors of Opinions concerning the Origin of Hot Natural Baths, in the xiiith Chapter of his Treatise of Natural Baths, and Mineral Waters; where he has handled his Subject, like a true Natural Philosopher; especially where he evinces the great Impossibility of these Waters, owing their Warmth to fubterraneous Fires; infomuch that I am much furprized, that some of our most eminent Physiologists of the prefent Age, should give into so gross a Mistake, in this Object of Natural Philosophy, and attribute the Heat, or Calefaction of these Waters, against all Propriety of Reason, to the Subterraneous Fires kindled by Sulphur and Iron, in the Bowels of the Earth, and in the Teeth of so early and so just a Refutation of its Possibility.

But notwithstanding that Dr. Jorden makes Use of the Word Fermentation, yet he conjoins such clear Definitions, as explain him to mean by it, a Motion or Mixture of the Fossils in the Bowels of the Earth, creative of the Heat proper to these Mineral Waters, resembling rather a Fermentation, than Fermentation itself absolutely and essentially so taken; and it is therefore but doing Justice to that celebrated Work, to rectify a Mistake, that lies more in the Word, than in the Thing. Had Dr. Jorden been acquainted with the Discoveries made since his Time,

and Artificial Chalybeat Baths. 47 he would probably have substituted another Word to that of Fermentation *.

For

* Here I think, it may not be improper to insert Dr. Forden's own Words, in Proof, that he did not use the Word Fermentation in the present literal definite Sense thereof, but as the best Term that occurred to him, for expressing that Motion, which I have more scientifically distinguished under the Name of Vapours, or Mineral Damps, which plentifully contain the Phlogiston. But as to what he afferts of the Foundation of this Motion being the constant Generation of Metals, it is a Deception he gives into, for want of knowing or confidering, that the Cavities, or Veins, when they yield a fecond Time Ore, must contain Terra Vitrescibilis, of which I have largely treated in my first Chapter. My Quotation from Dr. Jorden, as follows, is taken from his XIVth Chapter, Page 104, &c. "I have, " in the former Chapter, fet down mine Opinion concerning the "Generation of Minerals, that they have their Seminaries in " the Earth replenished with Spirits and Faculties attending them; " which meeting with convenient Matter, and adjuvant Causes, " do proceed to the Generation of feveral Species, according to " the Nature of the Efficient and Aptness of the Matter. In this "Work of Generation, as there is Generatio unius, fo there " must be Corruptio alterius. And this cannot be done without " a superior Power, which, by Moissure dilating itself, worketh " upon the Matter like a Ferment, to bring it to his own Pur-" pose. This Motion between the Agent Spirit and the Patient " Matter produceth an actual Heat (de motu fit calor) which " ferves as an Instrument to further this Work. And this 66 Motion being natural, and not violent, produceth a natural " Heat, which furthers Generations, not a destructive Heat. " For, as Cold dulls and benumbs all Faculties, fo Heat doth " quicken them. This I shewed in the Example of Malt. It " is likewise true in every particular Grain of Corn sown in the Ground, although, by Reason they lie single, their actual " Heat is not discernible by Touch; yet we find that external " Heat and Moisture do further their Spiring, as adjuvant " Causes, where the chief Agent is the generative Spirit in the " Seed. So I take it to be in Minerals, with those Diffinctions " before-mentioned. And in this all Generations agree, that " an actual Heat, together with Moisture, is requisite; other-" wise there can neither be the Corruption of the one, nor the "Generation of the other. This actual Heat is less fensible in " fmall Seeds and tender Bodies, than it is in the great and " plentiful Generations, and in hard and compact Matter; for " hard Bodies are not so easily reduced to a new Form as tender

48 On Natural Hot, CHAP. II.

For the Word Fermentation is restrained to three

66 Bodies are, but require both more Spirit, and longer Time "to be wrought upon. And therefore, whereas Vegetable "Generations are brought to Perfection in a few Months, these " Mineral Generations do require many Years, as hath been " observed by Mineral Men. Moreover, these Generations are not terminated with one Production, but as the Seed gathereth Strength, by enlarging itself, so it continually pro-66 ceeds to subdue more Matter under his Government: So as, " where once any Generation is begun, it continues many Ages, and feldom gives over, as we see in the Iron-Mines of Illva, " the Tin Mines in Cornewal, the Lead-Mines at Mendip, the " Peak, &c. which do not only stretch further in Extent of "Ground, than hath been observed heretofore, but also are " renewed in the fame Groves, which have been formerly wrought, as our Tinners in Cornwal do acknowledge, and " the Examples of Illva and Saga before-mentioned do confirm. "This is a fufficient Means for the Perpetuity of our Hot Springs, " that if the actual Heat proceed from hence, there need be no " Doubt of the Continuance of them, nor of their equal Tenor of Degree of Heat.

" Now for the Nature of this Heat, it is not a destructive " Heat, as that of Fire is, but a generative Heat, joined with " Moisture. It needs no Air for Eventilation, as the other doth. " It is in Degree hot enough for the hottest Baths that are, if it " be not too remote from the Place where the Water issueth of forth. It is a Means to impart the Qualities of Minerals to our Waters, as well as Heat, by Reason the Minerals are " then in Solutis Principiis, in their liquid Forms, and not con-" folidated into hard Bodies. For, when they are confolidated, " there are few of them that will yield any Quality to Water, " unless they be the concrete Juices, or any actual Heat, be-" cause that is procured by the Contiguity of Bodies, when " one Part lieth upon another, and not when they are grown " in Corpus continuum; as we see in Malt, where by turning " and changing the Contiguity, the Heat is increased; but, by " suffering it to unite, is quenched. But, before Consolidation, " any of them may yield either Spirit, or Juice, or Tincture to the Waters, which, by Reason of their Tenuity (as is said " before) are apt to imbibe them. Now, if actual Fire kindled in the Earth should meet with those Minerals, whilst they " are in Generation, it would diffipate the Spirit, and destroy the Minerals. If it meet with them after Consolidation, it " will never be able to attenuate them, fo as to yield their "Qualities to Water. For we never find any Metals or Mi-" nerals melted in the Earth, which must be, if the Heat of

three Divisions: Fermentatio spirituosa, ace-tosa, and putredinosa.

The first (spirituosa) is appropriated to

Wine, Beer, Spirits, and the like.

The second (acetosa) to Vinegar, or other

Acid Vegetable Juices.

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The third (putredinofa) is the common Putrefaction, universal to all Animals and Vegetables.

Fermentation, therefore, cannot with Propriety, find a Place in the Mineral or Fossil Kingdom, though the Motions occasioned by Fossil Mixtures, are frequently called Fermentation.

Dr. Sympson has indeed laboured to bestow his Animadversions on the Errors of Dr. forden, on Fermentation; but without much

understanding the Matter himself.

And, indeed, the strongest, and clearest Light that has been thrown upon the Subject of Fermentation, we owe to the Care and Improvements of the most learned Dr. Stahl, whose Treatise on Fermentation, it is much to be desired, should be translated by an able Hand; for the Good of the Public: And certain it is, that the Brewers, Bakers, and in general all Mechanics, who have their Business any ways depending on Fermentation,

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actual Fire were fuch, as is imagined; neither do we ever find any Stores of Metal sublimed in the Earth. This natural Heat is daily found by our Mineral Men in the Mines; so as oftentimes they are not able to touch them, as Agricola testifieth; although by opening their Groves, and Admission of Air, it should be well qualified: Whereas, on the other Side, it was never observed that any actual kindled Fire was ever seen by Workmen in the Earth, which were likely to be, if these Fires were so frequent."

might receive notable Benefit and Improvement, from the Discoveries and Hints therein

fuggested and contained.

In short, there are so many Differences in Opinions, and fo many different Notions entertained, concerning the Origin and Existence of these Waters, that it would be both needless and useless to instance more of them here: but yet I cannot omit mentioning the Opinion of Dr. William Turner, who, in my Judgment, has excelled in Truth all the Writers, that have as yet treated on this Subiect: In his Observations on this Head, he clearly and concifely, without any Equivocation, or Philosophical Art, expresses himfelf thus, speaking of the Waters at Bath in Somersetshire: "The chief Matter, fays he, " whereof these Baths in this City have " their chief Virtue and Strength, after my " Judgment, is Brimstone, &c. &c. (Page 1.)" That this Affertion of the Doctor's is agreeable to Truth, I will make appear in my following Discourse on that Head; and I will likewife mention, in what Manner Brimstone may be supposed to warm these Waters, of which Dr. Turner tells us nothing.

As I shall endeavour to prove, that the Hot Waters, or the Principles that occasion the Heat in them, are owing only to two Causes. I think it will be first necessary, in Order to prevent any Misconstructions that may arise, to acquit myself, that I neither say or mean that these Waters are destitute of other Mineral Particles or Contents, benefi-

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cial and useful in many Diseases; but I only exclude these Mineral Spirits, Mixtures, or whatever they contain, intirely out of the Question; as Principles that occasion Heat in these Waters, or are in any Shape instrumental or affishing to this Water Concrete, to its

becoming warm or hot.

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We all know, that Brimstone or Sulphur confifts of nothing else but Phlogiston, and Acid Salt, or Acid of Vitriol; and that this Sulphur continually generates in the Bowels of the Earth; which may be supposed in this Manner; wherever it happens that the Phlogiston meets with the strongest Acid of Vitriol, it impregnates the latter fo long, till it becomes a substantial Brimstone; but if it happens that a constant Current of Water passes upon this Mixture, before it is confolidated and compleated, then this Water becomes hot, as it always will do, when mixed with the Oil or Acid of Vitriol; and much vehementer hot, when this Acid is strongly imbibed with the Phlogiston. Thus the Hot Waters are occasioned; and their Continuance may be accounted for, thus: The Acid is fupplied by its own Matrix, and partly from the Acidum vagum in the Air, which is constantly circulating through the Globe; and the Phlogiston is constantly supplied by the Mineral Fumes or Vapours (of which I have been more particular in the first Chapter) when by these Means, or in the aforesaid Manner, the hot or warm Waters in the Bowels of the Earth are compleated, then they

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rife to the Surface, and break out in that Manner, which the Atmosphere will permit.

I suppose it may be here objected, that, if these Medicinal Waters received their Origin and Existence in this Manner, then the fame would contain an Acid Tafte in them. as it is well known they do not. To this I answer, that, if it happens that the Acid hath a finall Quantity, or not any Phlogiston, then these Waters would contain in them a four or Acid Tafte and Smell; but, as the Acid has a good Share of the Phlogiston, the Acid Tafte and Smell is thereby prevented, and changed into another Nature. The Truth of this Affertion will appear from Brimstone. which confifts of nothing else (as I have before observed) but of the strongest Acid and Phlogiston; and though a whole Pound of Brimstone contains no more than one Dram of Phlogiston, the remaining 15 Ounces and 7 Drams being nothing elfe, but the strongest Acid of Vitriol; yet, as long as this small Quantity of Phlogiston remains, we cannot tafte the Acid in the Brimstone; this very fame Cause occurs to the Hot Waters, which prevents the Acid from becoming perceptible to the Taste.

Since, perhaps, it may be enquired into, upon what Foundations my Notions of this Doctrine are built and supported (as Nature does not permit an ocular Inspection into it) I will state the Motives that have led and confirmed me in this Opinion, which are the

two following. (1/t,) I, or any other Chemist, can produce a Brimstone from these Waters, that will be almost compleat; and which, by adding a very small Quantity of Phlogiston, will constitute a compleat Brimstone. (2dly,) A soft Brimstone, where the Phlogiston is partly destroyed, by adding thereto cold Water, will create a hot one, which partakes very much of the same Nature, as the Natural Hot Waters; which the Mixture of Iron and Brimstone, as has been afferted, never can do: These, in my Opinion, are very strong Proofs of the Origin and Cause of the

Existence of the Hot Waters.

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In these, or such Parts of the World, where Nature had not supplied with Hot Waters, the Gentlemen of the Faculty oftentimes, in particular Cases, endeavour to imitate Nature by preparing Artificial Hot Baths, to answer the Purposes of the Natural Hot Waters; and, for this End, they commonly prepare them by the often-mentioned Method, viz. with Filings of Iron and Brimstone: But, as it will appear, by a strict Examination, that this Mixture cannot possibly occasion such a Hot Water, that will serve the Purposes of the Natural Hot Waters, I intirely recommend the Method of making these Baths with Brimstone only, where the Phlogiston is partly separated from it; and I venture to affirm, that Hot Waters, fo prepared, will have their defired Effect, and answer all the Ends of Natural Hot Waters, fo as not to be

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and Quality, by a nice Examination.

It perhaps too might be enquired into, what Power or Share the Atmosphere has, in this Mineral Water Concrete, fince it has been observed, that these Waters are warmer in the Winter, than in the Summer; for which I affign the following Reasons: As the Atmosphere, in the Summer, is naturally of an attracting Quality, and exhales a Phlegma, or Moisture from the Globe; by these Means, the Hot Waters are in some Shape interrupted, and, by the attracting Power, fome of their Spirits evaporate; but, as the Atmosphere, in the Winter, is not of that attracting Power, and as the Bowels of the Earth are, at this Time, in a Manner closed up, the Spirits of this Water cannot evaporate, and therefore confequently must be warmer from the Bowels of the Earth at this Season of the Year, than in Summer. But though Hot Waters differ from each other in Quality, as well as the Chalybeats; yet, all hot or warm Mineral Waters in General proceed but from one and the same original Cause, as related above.

The Waters at Aix-la-Chapelle, those of Bath in England, Charles-Bath, and feveral other Baths in Germany, which differ from each other in feveral particular Respects, and act upon the same Bodies in different Manners, are manifest Instances of the considerable Differences of Qualities, that are contained in, and are incident to these Waters;

all which Differences are owing to the Quantity of the Phlogiston, of which some contain more, and fome less. And again, a great many of these Waters are occasioned from an Acid, that has not so much Phlogiston in it, as is requisite to constitute a Brimstone: On the other Hand, there are many Hot Waters occasioned by an Acid, which possesses a greater Quantity of Phlogiston than is necessary to constitute a Brimstone: Then, again, when the Mineral Vapours continue to imbibe Brimstone that is compleat, it will become foft again, and will make cold Water hot: For the Confirmation of these Truths, I have made many fuccessful Experiments; agreeable to which, I will divide these Waters into three general Heads, and, according to the System and Rules prescribed, fpeak of them separately, and in Order, viz. (1.) Hot Waters, that are occasioned by an Acid, which wants a very small Quantity of Phlogiston, for the Perfecting and Complicating a Brimstone. (2.) Hot Waters, that are occasioned by an Acid, that possesses a very great Quantity of Phlogiston, more than is necessary to constitute a Brimstone. And (3.) Warm Waters, that are occasioned by a weaker Acid, that contains a very small Share of Phlogiston.

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The first Waters, that are occasioned by an almost compleat Brimstone, are the hottest, such as are those at Aix-la-Chapelle, Charles-Bath, Wishaden, and many others in Germany; the very Steam of these Waters is so

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ftrong and powerful, that it will stain and discolour Metals in the same Manner, as the Smoke of Brimstone will do. The Waters at Aix-la-Chapelle I deem the hottest of them, or perhaps of any other Bath in the World; as the Fumes of these Waters will reduce themselves into a perfect Sulphur, or rather Flours of Sulphur; so that we may from hence justly conclude, that the Matter, which is the Cause of Heat in these Waters, is almost a compleat Sulphur.

The fecond Waters, that are occasioned by an Acid, which possesses more Phlogiston than is requisite to constitute a Brimstone, are such as those Waters at Bath in Somersetshire in England, Xerxes in Portugal, Toplizer in Bohemia, and many more, which Waters do not give or emit a dirty, or smoaky Colour upon Metals, as the first Waters do; but, on the contrary, create a fine and beautiful yellow Colour, which, with many other Instances, convince us of the Plentifulness of the Phlogiston, which abounds in them; these Waters are also very hot, though not considerably so, as the first mentioned.

The third Waters, that are occasioned by a weak Acid, that contains a small Quantity of Phlogiston, are those that possess a Heat in them, from the Degree of Milk to Blood, and something warmer; under these the Buxton Waters may be comprehended, of which the learned and ingenious Dr. Short has given us a distinct Account.

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The Medicinal Uses of the Hot Waters are fo well known, that it is not requifite for me to be particular here, in this Respect. It feems indeed, that the Baths in ancient Times were in greater Use than at present, as appears from Hippocrates, who mentions them as very common in his Time; and that the Romans learned the Use of the Baths from the Grecians, feems to be without Dispute, as they named every Thing that belongs to these Baths, in the same Manner as the Grecians did. We also find that the Baths, I mean the Natural Hot Waters, as Dionis informs us, were first built by the Lacedamonians into proper Reservoirs, and other necessary Buildings, which, in Space of Time, became to be abused, and not only made Use of as a Medicine, but as a Cosmetic to preserve their Beauty, &c. for which however they paid dear: Then the too constant and immoderate Use of these Waters exhausted the Vitals, and infeebled the Nervous System, softening them almost to a perfect Mucus, and in a short Space of Time utterly destroyed Nature itself.

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In Confideration hereof, I think it necessary to observe here in general, that though all Natural Hot Waters have but one original Cause, yet each of them contain their particular Virtues, and are more or less efficacious in some Distempers, than in others: Consequently, these Waters ought not to be made Use of, without the Advice of a Physician, who is well acquainted with the Na-

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ture of them, and with the Distemper of

the Patient, that intends to use them.

All Persons under 50 Years of Age, will do well to avoid the Use of these Natural Hot Waters: unless the Case is such, that the whole Machine is contracted, fo that the Veffels, either by Labour or other Circumstances, are rendered callous, and that a fufficient Circulation of the Blood cannot possibly ensue: In these Cases, indeed, the Hot Waters may properly and fafely be used. But then, such as are under 50 Years of Age, who are of a robust Constitution, and have undergone great and heavy Labours, whereby they only have contracted Obstructions in the most extensive Veffels, and many other Diseases of the like Nature, that require Baths, ought to use the Artificial Chalybeat Baths. As there is no one Thing in the whole Materia Medica, that I know of, which can be administered, that is fo effectual to penetrate through the small and minute Veffels, and to pass through the whole Machine, without any Diffurbance to the Mass of Blood, as the Mineral Spirits of the Chalybeat Baths: Because the fixed Mineral Spirits in the Natural Hot Waters are too powerful and heavy for these Patients upon the Nervous System, and promote a too rapid Circulation of the Blood, or too violent, as, by Means of the extreme Velocity occafioned thereby, not only endangers the fmaller Veffels, fo as to split; but also they force and separate too much Serum from the Blood,

Blood, and oftentimes produce many other

fatal Consequences. Again,

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There are many Distempers, such as where the Nerves are contracted by a Scorbutic Matter, Barrenness, and other Obstructions incident to Women, where the Chalybeat Baths are the only Relievers; the Truth of this Affertion has been demonstrated by frequent Experience, and also by many Persons, in feveral other Chronical Distempers, who, not finding any Relief by the Hot Waters at Aix-la-Chapelle, or elsewhere, have gained a perfect Recovery by the Artificial Chalybeat Baths at Pyrmont, Wildunge, Schwelm, &c. &c. These Instances have been so very common, that both Practice and Experience has convinced many of the most eminent Gentlemen of the Faculty in Germany, that the Artificial Chalybeat Baths, in all Diffempers where Bathing is requifite, are far preferable to the Natural Hot Baths, for which they affign the following Reason:

"When the Chalybeat Waters are made " warm into Baths, according to Art, the

" volatile Spirits of these Waters, penetrating " through all the fmall and minute Veffels,

" are more powerful Removers of fo much

" refistible hardened Matter, as is the Occa-" fion of many Diforders; and are in general

" of much greater Service to the Human

" Body, than Natural Hot Baths are, be-

" cause it is supposed, that these Waters by

" their constant Heat lose these excellent Mi-

" neral Spirits."

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But, though the Artificial Chalybeat Baths. in many Instances are found to be so very useful and serviceable, yet the Natural Hot Baths are not for this Reason to be neglected or exploded, as in their Nature and Properties they contain their particular Virtues and Qualities. and by proper Application are instrumental to many good Purposes: But the Benefits that are derived from either of these excellent Waters, depend wholly upon the proper Uses made of them; and it is the Abuse or wrong Application that has occasioned great Prejudices against Mineral Waters in General. It is therefore highly incumbent upon all Perfons that are obliged to make Use of these Waters, to advise with such Physicians as are well acquainted with their particular Qualities and Natures, and with the Constitution of the Person, that designs to use them. If this Regimen was more carefully observed in England, than it really is; we should not see fo many return helpless from the Natural Hot Baths, and by improper Uses made of them, attended with fatal Confequences.

But with Respect to the Artificial Chalybeat Baths, I think it necessary to be more particular: Since I find by all Inquiries that I have been able to make, that these Baths are hardly at this Time known in England; at least not made any Use of, though the Island abounds with many of them. And as some Rules are required necessary for the Preparation of this Water for Bathing, I will give a

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fhort Account thereof, which I hope may not be unacceptable:

In Germany these Chalybeat Baths are

commonly prepared in this Manner:

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They put about three Pails of Chalybeat Water into a Copper-Boiler, closely covered, which, with a quick Fire, they make near boiling hot; this is poured into the Bathing-Tub, adding to it about two Pails more of the same cold Water: When by these Means the Bath is come to that Degree of Heat, as the Physicians approve of, the Patient goes into this Bath.

As these manual Operations are required to compleat these Waters sit for Bathing, I think I call them, not improperly, Artificial Chalybeat Waters.

In these Bathing-Tubs is made a Seat of Linnen Rags, upon which the Person that bathes seats himself; when so seated, so as the Water does not reach or come above the Stomach, the Bathing-Tub, together with the whole Body of the Patient (the Head only excepted) is covered, as described in the Figure, that no Steam can evaporate.

In this Situation the Patient remains as long as the Physician thinks proper for his Disorder, and if more hot Water should be required, the Bathing-Tub is supplied at the Feet-End.

In these Baths, the Head of the Patient has been frequently uncovered, and, by Cloths bound close to the Neck, prevented from receiving any of the Steam or Mineral Spirits; but this Practice is proved by good Authori-

ty to be prejudicial to the Patient, as by these Means the Humours of the Body were thrown up to the Head, and thereby have occasioned many incurable Diseases, such as

Deafness, Blindness, &c. &c.

I have therefore made an Addition to the Bathing-Tub (as explained by the Figure) that the Head may receive as much of the Mineral Spirits or Salts as the rest of the Body, which will be an effectual Method to prevent all dangerous Confequences, that might enfue from the Want of it: And this Rule I recommend to all Perfons that make Use of any Baths whatfoever.

There is another Method to heat or prepare the Chalybeat Waters for Bathing, in my Opinion, much preferable to the former, which, as it is not commonly known or made

Use of, I shall mention here.

According to this Method, the Chalybeat Waters are made hot in a wooden Machine, with a Globe and a Pipe fixed thereto; the Machine is filled with Water, fo high, that the Globe becomes also full; under this Globe (which is bricked up in a Furnace or Oven) is the Fire made, which almost in an Instant makes the Water hot in the Machine; or the Machine is filled with Water under the Reach of the Pipe that is fixed to the Globe, fo that these last are left entirely empty: Then the Machine that contains the Water, is covered as usual, and the Fire made under the Globe, from whence the Heat condenses upon the Water in the Machine, and by thefe Means

Means heats the Water very quickly, and at the fame Time prevents the Evaporation of the Mineral Spirits: For the better Explanation of this Machine, I have here annexed a Figure of the fame.

Places referred to in the Plan of the Bathing Machine.

A. A fquare bricked Furnace.

B. The Fire-place.

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C. The Ash-hole.

D. The Chimney.

E. A Body of a globular Form, capable

of containing nine Gallons.

F. A Cylinder Pipe, extending from the faid Body or Globe to a large wooden Bath or Ciftern that contains twenty Hogsheads of the *Chalybeat Waters*, marked G, G, the Back of which is secured in the Joints with a strong Clay, and kept covered when the Water is made hot.

H, H. A Bathing-Tub, large enough to contain one Person, which must be covered over the Top I. I. I. leaving sufficient Room at the upper End K, for the Patient to get into the Bath.

L. A Frame covered with Canvas, or any other Matter of an open Texture, fufficient to admit Air to prevent Suffocation, which is let down when the Patient is bathing, and continues fo, as long as can be endured. This Bath is fupplied with the hot or warm Chalybeat Waters from a Pipe marked M.

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The Globe and Pipe are made either of strong Clay (as the Crucibles are) or of Iron. Copper-metal is not fo proper for this Use: Because it will instantly attract that Acid from the Iron-Ore, by which this Mineral Ingredient is diffolved in these Waters, and by these Means will feparate and destroy, or diminish. these Chalybeat Principles. This Machine is far preferable to a Boiler, not only because it heats a greater Quantity of Water at once; but as it likewise preserves a greater Quantity of the Mineral Spirits, than those Waters contained in a Boiler, as being too much ex-

posed to the Fire.

There are most commonly two Sorts of Baths prepared of the Chalybeat Waters: of which one Method is to preserve so much of the volatile Spirits as is possible, which is done in the Manner abovementioned; the Bath, fo prepared, is then made Use of, when these Spirits are in Action, for being then capable of penetrating through the Skin, Sinews, Nerves, and Muscles; it irritates the same, and by these Means braces and elevates the laxed and weak Veffels, and restores them to their natural Strength and Substance; when the Nervous System by this Method receives its natural Strength again: The peccant Matter and all prejudicial Juices are expelled by the Power or Actions of this System, and by the Circulation of the Blood, and so carried off by Perspiration.

These Baths are chiefly used for weak and decayed Nerves, and Experience has con-

vinced

vinced us how extremely beneficial they are in these Maladies; but then they never ought to be made Use of, without the Advice of a skilful Physician, who is well acquainted with the Constitution of the Patient, and the Disease he is afflicted with; together with the Nature of the Waters, of which the Baths

are prepared.

But, before any Use is made of these Baths, all undue Juices ought to be first discharged (as far as the Case will admit of) either by Emetics or Cathartics. The fecond Method of preparing these Baths, is to make the Chalybeat Waters almost boiling-hot, and to let them stand in the Bathing-Tub, till all the Spirits of them are evaporated, and the Iron-Earth it contains, is precipitated or fettled to the Bottom: The Patients using these Baths, fo prepared, have often found great Relief from them. This Method of Bathing is of a very mild Nature, and as by Experience we find, that by this Method the Salts penetrate through the Human Machine, it has proved itself of great Efficacy to foften and destroy all hard Humours, such as Cancers, Schirrus's, &c. &c. &c. and to revive and moisten such Nerves, as are too dry and contracted, &c. &c.

Many other Methods are invented, for the Preparation of these Baths, but I think them

too infignificant to mention here.

All Chalybeat Waters, without Exception, are proper for these Baths; but such as are found

66 On Natural Hot, &c. Chap. II.

found at Tunbridge in Kent (more particularly mentioned in its proper Chapters) are the best and most useful for these Artificial Baths. I am really surprized (according to the Information given me) that these Artificial Baths are so little known, and made Use of; notwithstanding the many excellent Chalybeat Water-Fountains, this Island is blessed with.

As I take this Neglect to be a great Loss and Detriment to the Community, I would persuade all Proprietors of these Wells; but particularly of those at *Tunbridge* in *Kent*, to erect these Baths without farther Loss of Time; and if any Assistance, that is in my Power to lend, is wanted thereto, I should be very happy in giving my Advice and Direction, for the Completion of a Work so instrumental to the public Good.

I shall here conclude my Discourse on the MEDICINAL WATERS in General, and proceed to the PHYSICAL HISTORY of these Chalybeat Waters, I designed to treat of in particular; and of this in the succeeding

Chapters.

CHAP. III.

Of Tunbridge-Wells in Kent, and their Chalybeat Waters; with instructive Observations on their present Use.

As I have, in the two former Chapters, only occasionally mentioned in General that salutary Chalybeat Water at Tunbridge, and laid down the Manner, and Means of rendering it of more universal Use and Service to Mankind, by framing Baths of it; I will dedicate this whole Chapter to an Exposition of my Sentiments on these Medicinal Mineral Waters, and the Use at pre-

fent they are in.

Not having had an Occasion to make a Course of regular Experiments, or other than by Intervals, and at different Times, I cannot here give the Analysis of these Waters; but my having drank them myself has supplied me with Judgment enough to authenticate, what I shall here advance of them: And, if ever, as is much to be wished, Artisticial Baths come to be erected at Tunbridge-Wells, a compleat Physical History of these celebrated Waters, with a regular Series of Experiments, could not but be acceptable to the Public, as well as important, not to say, highly necessary.

F 2

The

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The only Author, who has wrote on these Waters, that I can meet with at least, is Dr. Rowzee: Dr. Pratt and Dr. Medan have also wrote on this Water, but I never could see their Works. Dr. Rowzee, having wrote early, is rather more forgotten, than he deferves; and at this Time scarcely known.

He has given Directions for drinking these Waters, but none for bathing with them: And, as they are now only used for drinking, I will here transcribe, what he has advanced particularly relating to the Chalybeat Waters of those Wells; to which I will subjoin a few Observations of my own, in Hopes they may not be unserviceable to such as take those Waters.

This Treatife bears the following Title:

The Queen's Wells, or a Treatise of the Nature and Virtues of Tunbridge-Water. Together with an Enumeration of the chiefest Diseases, which it is good for, and against which it may be used, and the Manner and Order of taking it. By Lodowick Row-ZEE, Doctor of Physick, practising at Ashford in Kent.

The Title-Page is dated 1671, without Mentioning of its being the fecond Edition; and yet licensed the Third of June, 1637, by William Bray, Chaplain to the Bishop of London; so that I am apt to think, that the Copy in my Possession is either a second Edition, or its Date a Mistake of the Press; for it is

of Tunbridge in Kent. 69

not very likely the Author would let the Manuscript of this little Work lie dormant, and unpublished for 39 Years, after passing the

Licenser.

But, though the above Title of this small Treatife supposes no other Subject, than the Chalybeat Waters; yet our Author launches out into five introductory Chapters, which have no Relation to those Waters, under the following Heads. First, Of Water in General. Second, Of the Differences of Waters. Third, Of the Original of Springs and Rivers. Fourth, Of Waters of a strange Nature and Effects. Fifth, Of Mineral and Medicinal Springs. Leaving then these five Chapters, as foreign to my Purpose; I shall only select the following, which treat of the Tunbridge-Waters alone.

Of Tunbridge-Water.

"The Water commonly known here 2"mongst us, by the Name of Tunbridge"Water, are two small Springs contiguous
"together, about some four Miles Southward
"from the Town of Tunbridge in Kent, from
"which they have their Name, as being the
"nearest Town in Kent to them. They are
"feated in a Valley, compassed about with
"stony Hills, so barren, that there groweth
"nothing but Heath upon the same. Just
"there do Kent and Sussex meet, and one
"may, with less than Half a Breath, run

" from those Springs into Suffex.

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" It pleased our gracious Queen Mary to " grace this Water by her Presence, two "Years ago; fo that those Springs may just-" ly be called, as fome do call them now, " Queen Mary's Wells. The Taste of the "Water is not unpleasant to those, who have " a while been used to it, and it is a sure "Thing, that no Man is able to drink half " fo much of any other Liquor, though never " fo pleafant unto him, as he may of this. "What other Minerals it runneth through, " befides Iron, and the Rubric of Iron, which " is feen on the Ground, over which the " Water runneth, is not yet well known; for " there hath been as yet no Digging near " about the same. The greater Part of those " that drink of it, are purged by Stool, and " fome by Vomit, as well as by Urine, which " perhaps should argue some other Minerals, " besides Iron. The same may peradventure " be discovered in after Time. Howsoever " though there were no other Minerals there-" about befides Iron, yet Iron being a Metal, " and all Metals, according to the Chymics, " proceeding of two Principles, Sulphur and " Mercury, wherefoever there are any Metals " bred, there must also of Necessity their " Principles be."

Observation the First.

We fee here, that our Author, by his little Skill in Chemistry, an Art in his Times very short of the Advances it has since made, was unqualisted to examine these Waters by this this Art, its infallible Touch-stone: No Wonder then, that he mistook in his Conjectures, that the *Tunbridge* Mineral Waters were impregnated with other Metals or Minerals besides Iron, and thereby occasioned their Vomiting and Purging Qualities. It is well known, that these Operations, or Actions in the human Body, are owing to the Salts that these Waters contain, which ever occasion Vomiting, when taken into an over-loaded, foul, or slimy Stomach.

Agreeable, however, as it may be to Reafon and Probability, that the Hills or Mountains, near or about *Tunbridge*, contain and abound in other *Metals* befides *Iron*; yet, granting that it were fo, I am clearly affured, that not they, but the *Iron-Ore* alone has a Share in the Origin or Generation of the *Cha-*

lybeat Waters of this Place.

"Besides this, all Metals have also their peculiar Salts; and Iron in particular hath a great deal of Volatile Salt, which is it that dissolveth in the Chalybeat Wine, now so much in Use. Now Iron is of an astringent and corroborating Faculty, and hath an opening Virtue withal, as may be seen by the Powder of Steel (Steel being nothing but a defecated Iron) which is used with good Success in the Green-Sickness, and in all other Diseases proceeding from Obstructions. But here I shall seem perhaps to fome to contradict myself, in making Iron both astringent and opening, which the

72 On the Chalybeats CHAP. III.

" Vulgar think to be two Qualities incom-" patible in one Subject; and yet they are " deceived, for to open and corroborate have " no fuch Repugnance, but that they are to-" gether in many Simples. Now, concern-" ing those two Springs, a Question doth " often arise amongst those, who are there a " Drinking, which of them should be the " better and stronger; but, being so conti-" guous and near together, certainly there can " be no manifest Odds betwixt them; and " though I often tasted of both, immediately " one after the other, yet can I not fay, that " I ever found any perceptible Difference be-" twixt them. Yet will I not deny, but that " it may so fall out, that at some Times the one may appear stronger than the other, " according as the Water may participate " more of the Virtue of the Minerals at one " Time, than at another; but I think that " there can be nothing conftant in it, though " they may alternatively fomething differ one " from another. This shall suffice to have " been spoken concerning those Springs. It " followeth now, that we make an Enume-" ration of the chiefest Diseases their Water " may be used for, wherein we will chiefly " follow Experience, feeing it is an emperical " Remedy, and yet fo as we shall not ex-" clude Reason. For, albeit it be empericum " Remedium, yet must we not use it altoge-" ther emperically, nor make it a Panphar-" macon, or a Panacea, a Medicine for all " Difeases, and fend thither promiscuously

"all Sorts of Patients, as some Physicians do
to the like Springs, when they are at a
Nonplus with them, and after a long Time
can do no Good upon them in Chronical
Diseases: For then they send them to those
Mineral Waters, tanquam ad sacram Anchoram. Which causeth those Springs to
become infamous, and to lose the Credit
they justly deserve (the common People
ordinarily judging of Things by the Event)
when some miscarry after the Use of the
fame, either because they were already so
far spent that they were sent thither, or by

Observation the Second.

" Reason their Diseases were not to be cured

" by that Remedy."

The Doctrine or Hypothesis of Salts peculiar to every Mineral and Metal is exploded, and we are now arrived at a more certain Knowledge in Metallurgy, than in this Author's Time. We know nothing of Volatile Salt of Iron: But I apprehend that he calls the Volatile Acid of Vitriol so, the chief Ingredient in the Chalybeat Waters. And this Volatile Acid so necessary in the Medicinal Mineral Waters, as it is the most salutary Property of them, the Waters of Tunbridge-Wells are enriched with a large Share of.

But, as for the Astringent and Opening Quality, which our Author attributes to Iron, I cannot say any Thing; as I am (still far from satisfactorily) certain of the Operations of all Preparations of Iron, or Medicines made

On the Chalybeats CHAP. III. of this Metal, on the human Machine; therefore I feldom prescribe these very precarious and unaccountable Arte facta; and when I do, it is with the greatest Caution imaginable. And, if the Chalybeat Waters did not contain this excellent Volatile Acid and Neutral Salts, I should have no Opinion of them in the Practice of PHYSIC; but, by Virtue of these Ingredients, the Iron-Ore is corrected, and becomes homogeneous, and falutary to Nature; and confequently these Waters ever operate quite differently from those Medicines prepared of Iron; and it is therefore more eligible to use these Waters fresh, at the Fountain-head, before they have evaporated any of their fine Volatile Spirits.

As to the Difference of the two Chalybeat Springs at those Wells, I can from my own Perceptions affent to it. And I humbly apprehend, that what is denominated the inferior Spring, might be made Use of to great and confiderable Advantage; by preparing Baths of its Waters, especially as the Spring, that is accounted fuperior, furnishes Water enough to fupply for Drinking. Our Author likewise acquaints us, that he takes these Waters for Emperic Medicines. But in this I differ from him, for, whatever they might be in his Time, I am well affured, that they are not fo at prefent; fince they require the being administered with as much Judgment as any Medicine whatever; and their Operations can be as certainly accounted for. And it is an Abuse of Practice much to be regretted, and,

I am

" But

I am forry to fay it, not to be denied, that they are too often to this Day, treated, and prescribed as an *Emperic Nostrum*, without Accuracy or Distinction.

The chiefest Diseases against which Tunbridge-Water may be used with good Success.

"Being now to reckon up the chiefest Diseases, which Tunbridge Water is good " for, we will not go a capite ad calcem, " from the Head to the Heel, but begin at " that, which it is most generally good for; " and that is Obstructions, which are the " Causes of infinite Diseases. This Water, "then, doth effectually open all Manner of " Obstructions, wherefoever they be lurking, " and especially the Obstructions of the Me-" faraical Veins, of the Spleen, and of the Liver, and that better than any Apozemes, or other Physic whatsoever. For these Ob-" structions being stubborn, and requiring a " great deal of Physic to be removed, and " Physic being both loathsome and charge-" able, People grow weary of it before a Phy-"fician shall have run a Quarter of the " Courfe, which is necessary for the removing " of those Obstructions; and that is the Rea-" fon that fo many are troubled with chroni-" cal lingering Diseases, which, in their own " Nature, are not incurable; but only re-" main incured, either because the Patient is " not able or willing to undergo fuch a Courfe " of Physic, as is requisite for his Recovery; " or because he loveth his Purse too well.

76 On the Chalybeats CHAP. III. " But these Waters being no Charges, and " after one hath been used a little while to " them, the Taking of them is not trouble-" fome at all; but the longer a Man conti-" nueth the Use of them, the more he may, " and being taken in a large Quantity, they " cannot chuse but open effectually. Where-" fore they are of excellent Use for all Dif-" eases, which have their Dependency upon " Obstructions, as all long and tedious Agues, "Quartans, and the like; for a Dropfy, " the black and yellow Jaundice, the Schir-" rhus Lienis, or hard Swelling of the Spleen, " which the common People call an Ague-" cake; the Scurvy, the Green-Sickness, the "Whites in Women, and the Defect and " Excess of their Courses. And albeit this " last Affertion feemeth to have fome Re-" pugnancy, in that we afcribe two contrary " Effects to one and the fame Agent; yet, " there is no fuch Matter; for the one is " done by opening of Obstructions, and the " other either by cooling the Blood, when " it is too hot and sharp, and so provoketh "Nature to Expulsion; or by corroborating " and strengthening the retentive Faculty. " And it is the Property of all equivocal A-" gents to vary their Operations according to " the Variety of their Objects, and of the " Matter they work upon: So the Sun melt-" eth Wax, and hardeneth Clay. This Wa-" ter doth also cut and extenuate tough, " clammy, and (if I may fo speak) Tarta-" rean Phlegm; and in that Regard it may be

" much

" much available for those, who are used to be troubled with the Cholic, when such an

" Humour is contained in their Guts."

Observation the Third.

Our Author has very judiciously pointed out the chief Diseases, in which these Waters may be serviceable. And we have a long Series of Experiences on our Side, to support and prove his Assertions, beyond Dispute. Provided always, that they are properly taken, and at the same Time aided and assisted, as the peculiar Case of the Patient may admit, or require.

He accounts also for the Operation of this Water, or its active Parts, upon the human Body; but I think he forgets their most effential Faculty, the Power of the Volatile Vitriol Spirits to penetrate through the minutest Vessels and Parts of the human Body, where the Medicines of the Shops are not able to pervade; but, in another Place, I have ex-

plained this more largely.

"It scowereth and cleanseth all the Passages of Urine; and therefore is good against the Gravel and the Stone in the Kidnies, Ure-

"ters or Bladder, where also it dissolveth and washeth away a Kind of clammy,

" phlegmatic Excrement bred in the Bladder, which, fometimes stopping the Passage of

" one's Water, maketh him believe that he is troubled with the Stone, as happened to

"one, that was himself a very skilful and

" famous Stone-cutter, who, being fully per-" fuaded that he had a Stone in his Bladder, " gave himself to another of the same Pro-" fession, to be cut at Namurs: But, when " he was cut, nothing was found in his " Bladder, but fuch a tough Humour, which " might have been diffolved and avoided " with Facility, by the Help of the Spa "Water, which was but a Day's Journey " from him. It is good also (in Regard of " the aftringent and healing Faculty it hath) " for all inward Ulcers, and especially for " those of the Kidnies and Bladder, and of " the Musculus Spinater, which openeth and " shutteth the same. And in Confirmation " of a bloody Urine, which had long trou-" bled them; and, amongst the rest, a wor-" thy Kentish Gentleman, with whom I went " thither the last Year."

Observation the Fourth.

In a compleat Stone and Gravel, I conceive these Medicinal Mineral Waters to have very little, or no Effect; except in such Cases, where the Urine is obstructed with slimy Matter; when, without Dispute, they are of Service and Efficacy. But, as these slimy Humours are the first Foundation of the Gravel and Stone, from the earthy Parts of the Urine gathering round and settling thereon; whereby they gradually form themselves into a stony or calculous Concrete: Therefore it may be safely granted, that the Beginning of these Distempers and the just mentioned slimy Humours

Humours may be removed by these Waters: And for *Ulcers* in the Kidnies, in Consequence of the *Venereal Distemper*, or otherwise contracted, these *Waters* are of sovereign Use.

" It is good also against all inveterate Dy-" fenteries, or Bloody Fluxes; as also all o-"ther Fluxes of the Belly, whether it be " Leienteria, Diarrha, or Fluxus hepaticus. " It doth likewise extinguish all inward In-"flammations and hot Diftempers; and yet, " for all that, the Stomach is no whit hurt " by the actual Coldness thereof, but rather " corroborated and strengthened, and Appe-" tite provoked, yea in some but too much, " as in myself for one: For, whensoever I " drank, either at the Spa, or at Tunbridge, " I was never able to fast with Patience until " Noon, but must needs Offam latranti sto-" macho offerre, cast a Bit to my barking "Stomach, before the rest of my Company went to Dinner. For this Cause, when I " was at the Spa, a Spanish Physician, who " was come thither with the young Prince " Doria (who was then but a Youth) would " not let him take the Water above two or " three Days, when he faw fuch an Effect " in him, fearing that he would receive more " Hurt by the Excess of his Appetite, than " Benefit by the Water; and, fo after a long " and troublesome Journey from Italy thi-" ther, he returned Home without any Profit. "The Nerves or Sinews, and the Original " of them, the Brain, are strengthened by " the Use of this Water, and consequently it

" is good against the Palfy, Inclination to an

" Apoplexy, Lethargy, and fuch like Dif-

" eases of the Head."

Observation the Fifth.

In Bloody Fluxes, these Waters may be of good Service, but, where there is a complete Dysentery, I cannot approve of their Use and Administration; as they cause too great a Velocity in the Blood, at a Time, when a calm and natural Circulation is most requisite and

necessary.

And we must naturally expect, that the astringent Quality of these Waters will have an unseasonable Effect on the Excoriations, or Exulcerations of the Intestines; so as to threaten the worst of Consequences: Therefore I hold it not good Practice to administer Chalybeat Waters in fuch dangerous Diftempers, as Dysenteries; and indeed, for the same Reason, in all inward Inflammations, and inflammatory Cases, they must be utterly avoided. But in the Flux of the Liver, I think they may be as fafely used, as in the Case of an obstructed one.

" And some Paralytics have been seen, " who fometimes avoided all their Water by

"Urine, and at other Times were as effec-" tually purged, as if they had taken a strong

" Potion, and withal fweated abundantly all " their Body over. All these Evacuations,

" and

"and Vomiting also, are sometimes seen in other Diseases, as well as in that; nay, befides that, in some Women you shall have an Evacuation by Urine, & per menses simul
beamorrhoidas. The Cause of all Rheums
and Distillations is likewise removed by
the Help of this Water, and all Diseases

" cured, which have their Dependency upon the same, for all that Verse of Schola Sa-

" lernitana:"

Jejunes, vigiles, sitias, sic rheumata cures.

Observation the Sixth.

As to the various Operations and Actions on the Body, proper to these Waters, such as Sweating, Purging, Vomiting, &c. they are governed by the Juices they meet with in the primæ viæ; and as these Juices entirely depend on the Diet, a fuitable Regimen is therefore requifite, and should be prescribed to these Water-drinkers; and preparatively a Vomit or Purge ought to be, and generally are given to obviate these Inconveniencies: And as the most sensible Actions or Operations of the Tunbridge-Wells Water are by Sweat and Urine, and rather cause Costiveness; therefore bitter opening Salts, taken at proper Intervals, are requifite to promote the wanted Evacuation; and we shall rarely find an Instance of a Patient, observing the prefcribed Rules, being either troubled with a Vomiting or Purging.

" Convulsions also, Head-ach, Megrim, " and Vertigo, are driven away by the Use " of the fame, if the Patient be constant, and " not too foon weary. Against Vomiting " and the Hickot, it is used with good Suc-" cefs. Those that are troubled with bypo-" chondriacal Melancholy, find a great deal " of Ease by this Water. It helpeth also the " Running of the Reins, whether it be Go-" norrhæa Simplex, or Venerea, and the Dif-" temper of the Parastatæ arising from thence, " as likewise a certain Carnosity, which grow-" eth fometimes in the Conduit of the Urine; " nay, and the Pox also, the Water having " a notable potential drying Faculty. It " driveth away befides all Manner of Worms, " whether they be ordinary ones, or Ascari-" des or Taniæ. It may be used also for the " Gout; but it must be with some Caution, " and the Body must be extraordinarily well or prepared and purged before: Because it " hath fometimes brought the Fit upon fome, " who were well when they came thither. " Outwardly applied, it doth help fore Eyes, " red Pimples, and other external Infirmi-"ties. More Difeases, which have Affinity " with these, it may be used for; but I will " content myself with this Enumeration of " the aforefaid ones, and pass to the Time, " Manner, and Order of taking the Water. "Yet must I not forget, in the Behalf of "Women, to tell them that there is nothing " better against Barrenness, and to make them " fruitful,

" fruitful, if other good and fitting Means,

" fuch as the feveral Causes shall require, be

" joined with the Water."

Observation the Seventh.

In flight Convulsions, these Waters may be serviceable; especially if warm Baths of them are used at the same Time; but of yet greater Service and Essicacy are they in bypochondriacal Disorders, and the Remains of the Venereal Disease; in which latter Case, I have known them of such great Service, that I hold it almost necessary for all, who have gone through a Course of Physic, or Salivation, to close with one of Chalybeat Waters, which are sovereignly good to recover and strengthen the Tone of the weakened and injured Vessels, and even to extirpate the Remains of Mercury lurking in the Body after the Cure.

But to extol these Waters as sufficient, of themselves, to effectuate a Cure of these malignant Disorders, he is nearly as much mistaken, as when he prescribes them for the Gout; whereas Mineral Waters, all (except the Selter Waters alone) should be avoided by those afflicted with that Distemper, as they will only render their Condition more miserable.

Of the Time, Manner, and Order of taking Tunbridge-Water.

"Some that shall read the next foregoing Chapter, will perhaps say, that I make G 2 "this

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" this Water a direct Panpharmacon, a Re-" medy for all Diseases; and therefore will " give small Credit unto it. But, for all that, " daily Experience doth, and, if it continue to be used, will more and more confirm " what I have faid to be true. For very few " of those, who live at the Spa (whose Wa-" ter hath great Affinity with that of Tun-" bridge) and in the Country about it, and " make that Water their ordinary Drink, as " many do; and myfelf have feen there very " aged People, that did never drink any "Thing else; few of them are troubled with " Head-ach, Heart-burning, Stone, Obstruc-"tions of the Kidnies, Liver or Spleen, Fall-" ing Sickness, and the like; and as for the " Jaundice, Dropfy, and Scabs, they do " not know what they are. Myself, during " my Stay there, being once rid out to take " the Air with a Couple of Gentlemen, and " a Shower of Rain coming, we made to a " Country-house near Hand, to shelter our-" felves; and, after the Taking a Pipe of " Tobacco, I requested the good Man of the " House (who was a very old Man, and yet " fresh and lusty, and with very few grey " Hairs) to give us a Cup of his Beer; but " he answered me, that he never had had " any Beer in his House; if we would drink " good Pouhon, it was at our Service, and he " had a fresh Vessel of it abroach. Poubon " is the Name of that Spring of the Spa, " which standeth in the Middle of the Town, cc and

of Tunbridge in Kent. and by the same Name they call also the

" Water thereof."

Observation the Eighth.

I agree with our Author, that the constant Water-drinkers do not know, by Experience at least, the Distempers he mentions: But I am afraid, the perfuading the Bulk of Mankind to give them firong Liquors with their Food, and to drink good common Water with it (no Occasion for Poubon, or any other Mineral Water) is an Attack upon a Luxury, too powerfully established to be shaken by the Physician's Remonstrances; even though they are fo strongly backed by the Authorities of common Sense and Experience: Even the certain Punishments, that threaten the Immoderate in their Diet, cannot, we fee, bring over any confiderable Number to the Side of Temperance, which is a Virtue big at once with Health and Pleasure.

" But to return to our Matter,

Temporibus Medicina valet, data tempore profunt. Et data non apto tempore, vina nocent.

"And so Water. The Time then of taking " those Waters is either the Season of the

"Year, when to come to them, or the Time

" of the Day, when to drink of the same. " Concerning the Season of the Year, Sum-

mer is the fittest, when there is settled

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" warm and dry Weather, as in the Dog

" Days especially:

Cum Canis arentes findit biulcus agros.

" And the chiefest Months be June, July, " August, and September; although the Dutch,

" who naturally love good Beer and Wine

" better than Water, used to have this rhim-

" ing Verse in their Mouths:

Menfibus in quibus R. non debeo bibere Water.

" And, according as the Year proveth, a Man " may fometimes come fooner, and continue " later. In general, whenfoever the Weather " is clear and dry, the Water is then best, " as well in Winter, as in Summer; yea, in " hard frosty Weather, the Weather is com-

" monly strongest, the Antiperistasis of the " Air hindering, that there is not fo great

" an Evaporation of the Mineral Spirits of the "Water. For when the Weather is rainy " or misty, and that Jupiter doth per cri-

" brum mingere, piss through a Sieve, as A-" ristophanes merrily speaks, the Water loseth

" much of its Virtue. Myself have known " at the Spa a Friar of the reformed Order

" of Saint Francis, a good honest temperate " Man, who affured me, that having been

" there three whole Years together continu-

" ally for the Stone (of which he shewed me " a Box almost full, of several Forms and

" Bigness) and taking the Water all the while

5' both Summer and Winter, when the Wea-

ther was feasonable, he found divers Times

" the Water better, stronger, and of a more fpeedy Passage in frosty Weather, than in

"the Middle of Summer, without ever per-

" ceiving any Inconvenience by the Water,

" no more at that Time, than in Summer,

for all he did always drink it cold."

Observation the Ninth.

Our Author gives a full Account of the Time, proper for taking these Waters, and withal deduces very sufficient Reasons, why they sometimes vary in their Degrees of Good-

ness or Strength.

And very remarkably, as well as justly, is the Story of the Franciscan Friar, who drank the Spaw, Summer and Winter, applicable to the Waters of Tunbridge Wells; no Reafon appearing, why they should not be as good and efficacious in the frosty Weather in the Winter, as in the Droughts of Summer, when there is Occasion for their Use.

And here I cannot help inferting an Idea of mine, which has frequently occurred to me; that, if the Nobility and Gentry, who attend the public Bufiness in Town, during the Winter-season, would, in their Vacancies, visit the *Tunbridge* Wells, situate as they are, at an easy Distance, and on clear Days drink the *Chalybeat* Waters, it would, in my humble Opinion, be a great Means of prolonging or maintaining many a valuable Life, in a good uninterrupted State of Health; as it would be a fure Means of removing or de-

G 4

oppilating

oppilating the Obstructions in the minutest and most extreme Vessels of the Body, which Gentlemen are so liable to contract, in those public Places, from that gross terrestrial Air, which is occasioned by the Smoak of that common combustible Fossil, the Pit-Coal, which is universal to this great City.

" For some that use to take it in cold "Weather, do warm it; but fure the Water cannot chuse, by that Means, but lose a " great deal of its Virtue, which, in the "Warming evaporateth away, feeing that in " the very Transporting of it the same doth " happen. When the Spa Water is bottled to be fent away, albeit those who have the Charge of it, be never so careful in " ftopping the Bottles close with boiled Cork, " and pitching them over, yet will the Mi-" neral Spirits find Way, infomuch as when you come to open them, you shall still " find fome want; and fometimes a pretty deal, especially of the Water of the Saven-" ter, which is more fubtile and spiritual " than that of Poukon. But to return to the " Matter, there is no more to be faid, but " that, in a Word, the Water is always best, " when the Weather is clearest and driest.

"Now concerning the Time of the Day, the Morning, when the Sun is an Hour, more or lefs, high, is the fittest Time to drink the Water. For when the Sun beginneth to be of Force, it doth attract some of the Mineral Spirits, and the Water loseth fome

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" fome of its Strength; and betimes in the " Morning, it is also best walking. And you " are so to drink the Water, as you may " have taken the Quantity, which you intend " to take that Day, within as fmall a Space " of Time, as conveniently as you can, with-" out oppressing your Stomach too much, as within an Hour, or less, if you be able. "Those that lie not too very far from the 55 Springs, and are able to use their Legs, " shall do better to come thither a Foot, than " to ride, because so they shall heat their " Bodies more. Yet, do I not intend they " should be fo hot, as to sweat, or to be ready " to fweat, for that would do Hurt; but I f mean only that their natural Heat should " be fomething awaked and excited, because " then the Water will be the better attracted, " and have the more speedy Passage. After every Glass, every two or three Glasses, " according as you shall be able to take it, " it will be good to take a few Carraway " Comfits, or Coriander-seed, some Galingall, " Zedoar, Elecampane, Angelica-root, or fuch " like, to help the Digestion and Passage of " the Water. In some it is necessary, that " they should have some Electuary, Lozenges, " or the like, appropriated to the Grief, for " which they take the Water. Divers do " take Tobacco after their Water, which I " do not dislike, especially if they hold it a "good While in their Mouths, before they " puff it out. Moderate Exercise after it is " very available; but I utterly dislike it, if

" it be too violent, as Running, Leaping, " Jumping, as fome in Wantonness used to " do. For that Kind of Exercise is rather a " Hindrance, than a Help, to the Digesting " of their Water; and many Times all the "Good it doth, is to bring it up again, " weakening by that Means their Stomach, " which, in Vomiting, doth always fuffer. "True it is, that, if the Stomach be foul, it " is not amiss sometimes so to do, and I am " not against it. After you have taken your " full Quantity, it will do well to walk and " ftir there up and down, and to compose " yourself to Mirth with the rest of the Com-" pany: For those that look to reap Benefit " by Tunbridge, must turn away all Cares and " Melancholy."

Observation the Tenth.

Our Author lays down very good Rules for the Time and Method of taking this Water, and the Exercise to be performed with it; but omits the most essential Caution, which must be daily noted and remembered; that those Corroboratives of the Stomach, designed in Aid and Assistance of the Digestion of these Waters, must be adapted to the particular Constitution and Distemper of the Patient.

[&]quot;In your Return to your Lodging, I hold it better to ride, than to go a Foot, because, sitting upon your Horse, the inward Parts, as the Muscles of the Belly, the Guts,
and

" and the Stomach itself, are thereby borne " up and contracted, and by Jogging of the " Horse moderately stirred, and so consequent-" ly your Water will be the better digested. "The Sign of the thorough Concoction of " the fame is commonly known, when your "Urine beginneth to have a Tincture, and " be coloured, and then may you go to Din-" ner; but of this we will speak of Pur-" pose, when we come upon Diet. I said " before, that the best Time of the Day to " take the Water was betimes in the Morn-" ing; and I mean also it should be the only "Time for that Day. For I have known " fome, who took it twice a Day, namely, " in the Afternoon also, but I could never " approve of it; and my Reason is, that, if " they take it foon after Dinner, their Meat " will not be digested, and the Water, forcing " to make Way for itself, will draw with it " the Chylus raw and unconcocted, and fo " cause Crudities and Obstructions, which will " do a great deal more Hurt, than the Water " can do them Good; and if they take it later " after Dinner, their Water will not be digested before Supper. Once a Day then is enough, left you have worse Speed by " making too much Haste. Now, for the " whole Quantity of the Water to be taken " in one Morning, it is a Thing which can-" not justly be defined, in Regard of the " Difference of Bodies in Age, Sex, Strength, f' and other Circumstances; but generally " those that are able to drink most, receive

" the most Benefit, so that they do digest and " void their Water well. And here it is, if

" any where, that the Greek Proverb should

" take Place, ή πίθι, ή ἀπιθι, aut bibe, aut abi,

" either drink, or be gone; if you cannot " tipple, this is no Place for you. Yet must

" every Man ever have this general Rule in

" Memory, A juvantibus & lædentibus optima

" judicatio, the best Judication or Direction

" is from those Things, which do Good, and " from fuch as do Hurt. You shall see some

" that arise to a great Quantity, and

Invenies illic, qui Nestoris ebibat annos.

"Three-hundred Ounces, according to Nef-

" tor's Years: Yea, and some a greater Quan-

" tity. And it is a Thing, that will make

"the very Women there filling the Glaffes,

" to laugh, to fee fome Patients fent thither

" by ignorant Phyficians, and appointed to " take ten or twelve Ounces of Water, and

" arife perhaps to twenty or thirty Ounces.

" But this may be a Rule for a Body of com-

" petent Years and Strength, to begin at

"thirty, forty, or fifty Ounces, and to arife

" by Degrees, increasing their Quantity every

" Day, to an hundred, an hundred and fifty,

" or two-hundred Ounces, more or lefs, as

" they shall be able; and so again to decline

" and decrease by Degrees, ending where

"they began, when they are to leave the

Water."

Observation

Observation the Eleventh.

No certain Rules can be laid down for the Quantity of these Waters, that should be taken in all Cases; but, in general, a copious Potion is requifite: Our Author, therefore, justly animadverts on the Ignorance of certain Physicians, that, sending Patients to these Waters, prescribe them in too small Doses; a Failure generally met with in those Practitioners, who trust too much to set Regimens: But as different Constitutions require different Quantities, and more or less Continuance; it is therefore much the best to advise with a Physician well versed in the Nature of these Chalybeat Waters, and fully informed of the Constitution and Distemper of the Patient; and by him only ought the Continuance to be determined, as well as the Quantity, the Dose to be heightened, or fallen with Judgment, according to the Stages and Variations of the Complaint.

"As for the Time of every Man's Stay there, it is a Thing which cannot be defined; for in some Diseases some Weeks suffice, in others divers Months are not enough; nay, in some they have Need to come this ther the next Year, and the next to that too. This, I hope, will suffice for the Time, Manner, and Order of taking Tunbridge Water; I will now pass to the Preparation of the Body of such as are to take
it.

Of the Preparation of the Body of Such as are to take the Water.

" I have fet down before the chiefest Dif-" eafes, which may be cured by the Help of " this Water; but I am not fo to be under-" stood, as though I mean that the Water " alone were fufficient for the same in all of " them, without any other Helps. For, al-" beit this be an empirical Remedy, yet must " it not be used altogether empirically, but " with Reason, Discretion, and Circumspec-" tion, otherwise Hurt, rather than Good, will " follow the Use of it. Many have fallen " into Difeases, as Fevers and Agues, by " coming unadvisedly and unprepared to those "Waters; although, as we faid before, there " is nothing better for Agues, than they are, " if they be rightly and advisedly used, the " Body being first prepared and purged. For, " although Blood, by a fole Diftemper of " Heat, may cause a Fever, yet cannot the " other Humours do it, as Galen well ob-" ferveth, unless they putrify, which they " will not do, if the Body be free from Ob-" structions, and perspirable; and therefore " that Body which is to be taken with an " Ague, must first be obstructed. Now these "Waters being very diuretical, when they " meet with a foul Body, having a Reple-"tion of gross Humours, they easily and " fpeedily carry the same with them into the " Veins, which not being able to give Paf-" fage to fuch a Quantity of Humours, they

" are thereby obstructed and stopped; and those Humours being there retained and wedged in, and not perstated or ventilated,

"they inflame and putrify, and so produce a

" putrid Fever or Ague. Wherefore those, that love their Health and Life, must, be-

"fore they use the Water, if they have not a very pure Body, prepare and purge the

" fame to prevent all Inconveniences.

"Now, according as Bodies do differ in Sex, Age, Temperature, Quality of the peccant Humour, and other Circumstances,

" fo must they accordingly diversly be pre-"pared and purged. And, in that Regard,

" we have not thought it good to fet down here any Forms thereof, but refer those

"that shall come to the Water to the Ad-

" vice and Counsel of learned and skilful

" Physicians, and such as are withal well ac-

" quainted with those Kind of Waters, which is the main Point. And as for those, that

" come far off, they may take Physic at

"Tunbridge, and it will be best for them so

" to do, because if they take Physic before,

" and prefently travel upon the same, it may

" produce some Danger."

Observation the Twelfth.

It is not only the best Practice, but, in my Opinion, indispensably necessary, to prepare the Body either with a Cathartic or Emetic, adapted to the Nature and Condition of the Patient's Constitution, or Disorder, at Tunbridge Wells, that is to say, on the Spot where

the Use of the Waters is immediately to succeed; and this, notwithstanding any Shortness of the Journey to them; because where there is a Dyscrasy, the gross peccant Juices soon return after a Purging or Vomiting; therefore the Chalybeat Waters ought instantly to follow after these preparatory Evacuations, which must necessarily too be repeated, in due Intervals, and as the Case of the Patient shall be found to require: The Expedience of which Method our Author very sensibly accounts for, in his Observation that these Waters easily carry the gross, unnatural, peccant Humours into the Sanguisication.

Humours into the Sanguification. " If the Refort to the Water continue, " and that there be competent Company at " the same, I do purpose, by the Grace of " God, to be there every Summer (for it is " a Place I like) and if any be pleafed to " confer with me, I will be ready to afford "them my best Counsel; and they shall find " there Variety of Physic, appropriated to " the feveral Difeases, which the Water is " to be used for. Neither is it enough to " prepare the Body, and take Physic before " Coming to the Water; but it is requisite " also, in some Diseases, to take something " now and then, during the Time they use " the Water, to help the Working of it, and " to cause a happy and prosperous Effect by " the same; and so much the more, because " fome are not able, either by Reason of "Bufiness, or otherwise, to stay there a comredressed and helped by other Means. But of these Things, neither myself, nor any man different myself, nor any and therefore I will conclude, and pass to the Diet requisite to be observed there.

Of the Diet to be observed by those that use Tunbridge-Water.

" Diet, among Physicians, is taken in a larger Signification than it is with the Vulgar; for, befides Meat and Drink, it comprehendeth Air, Motion, and Quiet, Things retained and voided, Sleeping and Watching, and the Paffions of the Mind. All these must be rightly ordered, both to preferve, and to restore Health. As for Air, it must be taken, such as it is found there, and I think there is no great Exception to be taken against it, being thereabout pure and wholesome enough; of Motion and Quiet we have faid fomething before, when we fpoke of Exercise, as also of the Passions of the Mind, when we wished all such as come to the Water, to compose and frame themselves to Mirth, and to leave all Cares and Melancholy at Home. Concerning Sleeping and Watching, a Moderation must

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" be observed therein, though it be better to " fleep fomething too much, than to watch " too long; and therefore you shall do well " to fup betimes, and to go to Bed betimes, " Animo securo, quieto, & libero, that the first, " fecond, and third Concoction may be ended, " before you take the Water. And, as for "Things voided and retained, you must en-" deavour to have the Benefit of Nature by " all Manner of ordinary Evacuations, as by " Stool and Urine, and the private Excre-" ments of the Brain, at the Mouth and " Nose. And thus much in brief concern-" ing those Things; we will now come to " Meat and Drink. Bread is commonly, " and with most Men, the chiefest Part of " Food, and therefore, though always, yet " here more especially, you must have a Care " to have Bread of good pure Wheat, well " handled and feafoned in the Making, and " well baked: For the Excrements and ill " Humours, which are heaped by the Use of " ill Bread, are worse than those, which pro-" ceed from Meat. Ravel Bread generally " is wholefomer than Manchet, and not fo " apt to breed Obstructions, having some of " the Bran left in it, which is detergent, and " maketh it pass the better.

"As for Meat, let every one feed upon that, which he hath been most used to, so it be good Meat, yielding good Nourishment, and of easy Digestion; and let him shun the Use of Sauces, which have much Butter and Spices in them. For it was a good

" Admonition

Admonition of Difarius, a learned Physician in Macrobius, Vitandos esse cibos, qui ultra stim & famem appetentiam producerent. "That those Meats were to be avoided, " which did lengthen Appetite beyond Hun-" ger and Thirst. If you can, be you con-" tented with one Dish at a Meal, for Multa " fercula multos morbos ferunt, Many Dishes " bring many Diseases, and Perniciosa senti-" na est abdomen insaturabile, An unsatiable " Belly is a pernicious Sink. In foul Bodies " especially, Over-feeding doth a great deal " of Hurt, according to that Aphorism of Hippocrates, Τὰ μη καθαραίων τωμάτων, " όκοσον αν θρεψης μαλλον βλαψεις, The more " you nourish foul Bodies, the more you " hurt them. In a Word, a moderate fober " Diet is always best, but especially here. " As for the Kinds of Meat, albeit, amongst " the Flesh of four-footed Beasts, Pork and " Veal be chiefly commended in our Books, " yet here, in Regard of their Moisture, I " prefer Mutton before them. And if Pork " be to be avoided, much more Pig, Lamb, and fuch like flashy Meat. As for Beef, " though it be discommended by some Au-" thors, yet good Beef well fed, and of an " indifferent Age, may be used without Scru-" ple, especially by such as have been ac-" customed to it; for these Authors were " never acquainted with our English Beef. " If Oxen indeed be killed when they are fo " old, that they be past Labour, their Flesh " cannot be wholesome, nor is it to be com-H 2 " mended.

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"mended. But, for our good fucculent Beef here, I verily think, that if those Authors were alive again, and should taste of it, they would be so far from forbidding it, that, to the contrary, they would commend it. For, if they do so much commend Veal,

"I fee no Reason they can have to discom-

" mend good fucculent Beef."

Observation the Thirteenth.

The Air at Tunbridge-Wells is as good as can be wished for, or expected in this Island. Provisions of all Kinds are easy to be had there. The Houses are commodious and pleafant; fo that there can be no where greater Conveniencies, or better Accommodation for the Reception of Company of the first Distinction. The Inhabitants are very civil, and, as far as I could extend my Acquaintance with them, I found them in general very just and reasonable in their Dealings, which is the more commendable, in that they chiefly confift of fuch as depend on their public Bufiness; whereas most of these Places of occafional Refort are accounted to abound in Exacters, which indeed too often proves true: But I am heartily glad of this Occasion, to do no more than Justice, in ranking Tunbridge-Wells amongst the honourable Exceptions; and indeed it is the only Place of that Nature I have yet feen, where the Landlords use their Guests with any tolerable Conscience or Moderation, though I have been at a great many of the like noted Places for Mineral Waters.

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Waters, though not in England, except those near London, of which I shall treat in the succeeding Chapter. I hope and wish therefore, that all the Places of Resort to these Medicinal Waters may afford as good Usage and Reception as Tunbridge-Wells, of which

I speak experimentally.

Yet even there, I owe to Impartiality fome Exceptions from this general Character of the Place: There are a few, on whom it would be good to fet a Note for their being avoided, that ranfom their Guests. The Landlord, where I first lighted, taking I suppose the Advantage of my being a Stranger, imposed excessively on me: No Body could however use fairer Words, or more Civility; but then no Body accommodated worse, or brought in more exorbitant Bills: He had a Servant, worthy to be remembered for his Simplicity and Honesty, who was nicknamed Sir Edward; when expostulating with him on his Master's unreasonable Demands, he answered me, That there being but a short Season in the Year for making his Harvest of his Guests, it behoved his Master to think of living in Winter, as well as in Summer, and that the Company ought to make A!lowance accordingly: By the Way, this arch Fellow would have fubscribed a Number of entertaining Stories for a Writer of Tunbridge Amusements. I did not stay however long at this Cut-throat's House, but having tried others, may pronounce very candidly that I H 3

found no more of the Stamp of my first Landlord.

Our Author very rationally recommends the Choice of good Bread to our Waterdrinkers, requiring it to be well kneaded, feafoned in the Making, and well baked. These are indeed Circumstances, which ought to be carefully attended to; but this is not the Capital Point that renders common Bread not only unwholesome to Mineral Waterdrinkers, but indeed generally fo in this great Town especially, and is owing to a most pernicious Custom in Practice amongst the Bakers. in this Writer's Days perhaps unheard of, and now if not fo generally known, it is at least felt feverely by many Thousands in or near this great City of London, and the adjoining ing Counties, to the great Damage of their Healths. And this deadly Mischief arises from the Bakers using Quantities of Allum in the Composition of their Bread, dissolving this Drug in the Water, they use to the Mixing, which makes the Bread turn out beavier and whiter; and this heterogeneous Mixture occasions Obstructions, which become the Foundation of feveral other almost incurable Distempers; incurable, I say, because their Cause not being known and removed, the Distemper is constantly nursed from the Bread continuing so considerable a Part of the Patient's Food; infomuch that, not improbably the Confumption, that Difease so ordinary in this Nation, may, in a great Meafure, be owing to this unjustifiable Mixture

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in the Bread, an Abuse not intirely unworthy the Intervention of the Legislature to abolish. But especially let me recommend to the Water-drinkers at *Tunbridge-Wells*, to take particular Care that the Bread they use, in the Time they drink these Waters, be not whitened with Allum.

"Befides Mutton and Beef, you may fometimes have Capons, Hens, Pullets, Chickens, Pigeons, Partridges, Pheafants, Black-birds, and other fmall Birds, Rabbits, and the like. And, because some Hares are sometimes caught about Tunbridge, it is a Question, which some ask, Whether those who are there at the Waters, may feed upon them? They are grown infamous, and banished from most Tables undeservedly, out of a Conceit that they are melancholy Meat. But I will now take their Cause in Hand, and vindicate them from that Imputation, if I can, saying with Martial:

Inter aves turdus, si quis, me judice, certet; Inter quadrupedes gloria prima lepus.

" And left I feem to give too easy an Assent to the Poet (though he was not a meer

" Poet, but well grounded in natural Philo-

" fophy) I will strive to prove, that it is not melancholy Meat, but Meat for melancholy

« Men.

"First, I will bring in Galen to patroci-H 4 nate 104 On the Chalybeats CHAP. III.

" nate unto him, who prefers the Blood of a Hare before that of Hens, Pigeons, and all other Birds, and faith that it is most when the standard of the standar

" fweet and dainty. Now, if Hare's Blood be fo good, how can the Flesh thereof be

" naught, which is made and produced by

" it, Flesh being nothing else but Blood co" agulated and converted into the same.

"The fame Authors fay also, that Hare's "Flesh breedeth better Blood, than Mutton "or Beef. And if these two come every

"Day to the Tables even of the noblest and

" richeft Persons, why should the poor Hare, which is better, and yieldeth better Nou-

" rishment than they, be banished from the

" fame?"

" After Galen, learned Heurnius reckoneth " Hare's Flesh in the first Place amongst " those Meats, which alter Melancholy in " the Kidnies; but to alter and free from " Melancholy, cannot both be done by one " Kind of Meat. For if any Man would " fly here to Similitude of Substance, or to "an hidden Property, he should deserve to " be hiffed at. But they fay, it is a melan-" choly fearful Creature. What Reason they " have to call him fo, unless it be because " he shunneth and runneth away from the " Dogs, which purfue him, I do not know; " But if that be all, Do not Wolves, Bulls, "Bears, yea and Lions also, the like? If we " may believe those, who have been in A-

" frica, an old Woman there, or a Child, " with a Stick in their Hands, do drive away " Lions,

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" Lions, as we do Dogs here. And a Hare is " not so fearful, but that you shall see some " of them turn about, and look upon the " Dogs after a daring Manner. They do not " lie in Holes and Burrows, as Conies do, " which in that Regard should be more me-" lancholy, and yet they are in most Use a-" mongst us, and accounted the best Meat. " And as for their Food, it is the same with " that of Partridges, the Excellency whereof " is no where controverted; and with the Use " of them only, the Pox may be cured, as " Cardan holdeth, who could speak of it by "Experience; as having had that Difeafe " feven Times, as himfelf witneffeth in that " Book of his, which he entitleth De uti-" litate ex adversis capienda; and fure his "Witness is not to be rejected. Let the " Hare then return in Use, and be re-admit-" ted to his former Preheminence; so he be " not too old, but of a competent Age, as " of a Year, or lefs. But, as for Water-" Fowl, you shall do well to abstain from " the fame.

"Concerning Fifh, though it be for the most Part unwholesome, and apt to breed excrementitious and slimy Humours; yet, for a Change you may sometimes eat some River Fish, that is firm and not slimy, as Trouts, Gudgeons, Pikes, Perches, and the like, either broiled or boiled in Wine (if you will go to the Charges) rather than in Water, and corrected with Fennel, Spearmints, Thyme, Rosemary, Parsley,

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" or the like. But for Mints in particular, " let those Women, that come to the Waters " for Fruitfulness, refrain the same, because " it is thought it hindereth Conception. At " your Fruit, you may use some Raisins of " the Sun, a Bit of Marmelade, a roasted "Wardon or Pepin with Carroways, or the " like: But in all this you must be sparing. " Now, for an End of all, I must repeat " what I have touched before, namely, that " you avoid Variety of Dishes. For the Na-"ture of feveral Meats being diverfe, and " fometimes clean opposite and contrary one " to another, and fome fooner concocted, " and others later, from hence those Evils " will arife, against which you come to feek " Help from the Water, as Crudities, Wind-" gripings, Pain of the Reins, Obstructions " of the Mesaraical Veins, Rawness of the " Chylus, and consequently of the Blood, " which shall be made of the same, and " fuch like Inconveniencies, which, by a " fober and moderate Diet yet may be a-" voided.

"Thus much concerning Meat. As for Drink, good ordinary clear Beer, and of an indifferent Strength and Age, is best; and it is the ordinary Drink of this Island, and which agreeth best with the Nature of those, which are bred in it. Yet if any having been used to drink Wine at Meals, desire to continue the same, I am not against it, if so be they be not of too hot a Constitution, and have no principal Part

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"offended through Excess of Heat; for a Cup of Wine or two at Meals doth but help to make the better Digestion. And for that Purpose Sack or Claret are better than White Wine; because White Wine, by the diuretical Faculty it hath, passeth too soon away, and before the Chylus be thoroughly perfected, and so it may carry fome of the Chylus raw and unconcocted with it, and consequently breed Crudities and Obstructions. And thus much concerning Diet."

CHAP. IV.

Of the Chalybeat Waters at Islington, called the New Tunbridge-Wells. Of the Waters in Saint Winifred's Well at Holywell in Flintshire, North-Wales: Also of of some Chalybeat Springs in that Neighbourhood. And of the Mineral Water, called the Neville Holt Spaw in Leicestershire.

A S foon as it came to the Knowledge of fome of my Friends, that I intended to publish a Treatise on the Chalybeat Waters at CLEVES, their extensive Concern, as much for the Welfare of their Country, as for that of Mankind in general, made them wish that

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that I would add fome Animadversions on the English Medicinal Waters, that I might have seen since my Residence in this Island; in Deference to which Desire, having already touched on those of Tunbridge-Wells, I proposed to take Notice of these, that had also fallen under my personal Observation, at St. Winifred's Well in Holywell, and some other Chalybeat Springs, I discovered in that Neighbourhood, hitherto unknown to the Public, without Mention of any other, from a Maxim fixed with me, to write nothing of Mineral Waters, on the Faith of others, but only of such, on which I have made authentic and satisfactory Experiments.

But my Friends, apprehending from thence a material Omiffion, infifted with me, on making fome Experiments on the Mineral Waters, in the Neighbourhood of this METROPOLIS, with the more Reason, they being suspected of Artifice and Contrivance, as produced by Insusion of old Iron, or other Drugs and Materials disposed in the common Water Springs under Ground, by the Pro-

prietors or Tenants of them.

For me then, who had feldom heard of these Waters, nor ever saw them, during a six Years Residence in the City of London; I was very ready at once to gratify my Friend's Requestrated and my over Conjugate.

Request, and my own Curiofity.

Accordingly, I went on the 27th of June, 1748, in Company with four worthy Friends, to the Chalybeat Spring at Islington, called the new Tunbridge-Wells, and arrived there at 50' Clock

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Clock in the Morning, which was mifty and hazy; to no greater a Degree however, than to oppose the quick Exhalation of the Mineral Spirits of the Chalybeat Waters, which I immediately strongly smelt, as did also my Companions, to whom I remarked it.

This Phenomenon is owing to a conftant Exhalation on the Fountain-head of those Mineral Vapours or Damps, wherewith these Waters are impregnated, and remain nevertheless equally strong in the Well, from their constant Supply under Ground. But, on a clear, serene, Sun-shiny Morning, these Mineral Spirits, rising quick, cannot be so perceptible to the Sense of Smelling, as they are not checked or opposed in their Passage, by the Interfering of the dense, misty Air.

Perceiving these excellent falutary Mineral Spirits in fuch a Quantity, I was agreeably furprized, and undeceived of the Prejudices created by the false and disingenuous Report circulated of their being a mere Artificial Compound: A Calumny clearly disproved by the Smell of the Mineral Damps; a Smell, which Artificial Mixtures can never attain to the Imitation of, and which, wherever we meet with them, carry a Certainty that the Waters are Natural and Medicinal. Such then are these, and I own I am forry to see fuch invaluable Gifts of Providence, placed fo near a Metropolis, where there are fuch numerous and urgent Occasions for them, in less Note and Esteem than they deserve, from

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an Error of public Opinion, which it was fo

easy to come at the Truth of.

The Proprietor of this Spaw, with great Frankness and Chearfulness, granted me the Leave to make a few Experiments on the Fountain-bead. He told me, that he had long wished for, and often defired and invited Gentlemen of the Faculty to make Experiments, that the Public, by their Means, might be fatisfied, that this Water was a Natural. and not an Artificial Compound: On which I observed to him, that, though I had not yet made any Experiments, I had already difcovered infallible Symptoms of their Genuinenefs, fuch as the Smell, and also that fat unctuous Matter, that lines the Glaffes, out of which the Waters are conftantly drank; which are evermore the certain Indications and Proofs of a Natural Chalybeat: Besides which, I acquainted him how to clear up any the least remaining Doubt by Mixtures, which I shall hereafter occasionally deduce.

There is, however, a reasonable Foundation for this Prejudice or Suspicion of the Medicinal Mineral Waters near London being the Compositions of Art: From such a Practice having been heretofore used, especially by Sir William Jennings, and Dr. Haworth, a Gentlemen of excellent Judgment and Skill in the Profession; the first having obtained a Patent from King Charles the Second, for Inventions of this Sort, and by Virtue of this Patent, the second did contrive and make Chalybeat Waters, in so peculiar,

culiar, exquisite, and ingenious a Manner, as to puzzle even good Judges, to distinguish them from Natural. And not improbably these artful Compounds were the first Causes of the Unbelief of Natural Chalybeat Waters,

in the Neighbourhood of London.

The only Author I can meet with, that has taken any Notice of the Waters at Islington, is Mr. Allen, in his Natural History of the Chalybeat and Purging Waters of England; and that is only in a transient short Account of them. According to him, " It " made no Alteration in a Solution of Subli-" mate, and, with Sal Saturni dissolved in " common Water, became a little milky " and curdled; and not clear as with a Salt-" Petre. With Lignum Nephriticum, it re-" mained pale, but clouded with a thickish, " dusky White, &c." But he enters not enough into the Detail of the particular Use and Efficacy of this Water, which is to be regretted, as not improbably, for Want of proper Directions for Medicinal Administrations, it has fo long remained in too little Use and Notice.

N. B. According to the Experiments I have made on this Mineral Water, I may class it under the third Division of Chalybeat Waters, stated in the first Chapter: I shall compendize several Experiments into one, where their Nature allows it, for the greater Facility of the Observations I shall annex to them.

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Exper. I. This Water taken in a Glass, and exposed to the Air, turns of a Pearl Colour, and the Mucilagium ferri appeared first on the Surface of the Water in a pale Copper Colour, which, after long Standing, received a little Quantity of the Iron-Earth. There appeared very few of the globular Bubbles; but the Vitriol Spirit appeared on the Sides of the Glass, and it was a considerable Time before the Iron-Earth precipitated itself, but in a small Quantity.

Observation the First.

This Water appears to me well charged with that flimy unctuous Matter, which I call Mucilagium ferri, from its being ever a Concomitant of the Iron-Ore, and is very homogeneous and falutary to the Animal Oeconomy. Then, as it is of a most astonishing, penetrating Quality, it pervades, and is carried through the whole Human Machine, strengthens and lubricates all the weakened and infeebled Vessels.

Now, this flimy Matter must not be taken for that Sublimate, to which Basil Valentine gives the Name of the Seed of Metals, and which I call the Nutriment of Metals. But this is an unctuous, or rather slimy Matter peculiar to the Iron-Ore; therefore, to guard against this Mistake, I distinguish it constantly by the Name of Mucilagium ferri.

And this slimy Matter is a Proof incontrovertible of the Islington Water not being the Production of Art, but intirely a natural

Generation.

Generation. For neither old Iron, nor other Materials whatever, however mixed by Art, are capable of producing that Tinge, or flimy Substance, which these Natural Mineral Waters are charged with. It is observed, that the richer they appear in this Iron-Mucilage, the more falutary Effects they produce, and the Islington Waters being imbibed with a competent Share of it, may confequently, with Justice, claim a Rank amongst the Medicinal Mineral Waters.

But, as the Vitriol Spirits and Mineral Damps line the Glass like a Sweat, yet do not rife to the Surface in globular Bubbles, I apprehend that this Water does not contain any elastic or universal Spirits, such as those of Tunbridge and other Chalybeat Waters are endowed with. The Tunbridge Waters contain also more Iron-Earth and Mucilage than these do.

Exper. II. This Water, mixed with Syrup of Violets, turns it green, or strikes a green Colour.

Observation the Second.

This furnishes me Occasion of throwing a just Light on the Nature of this Capital Experiment, which has hitherto imposed on and deceived the Public; being the greatest Proof the Partizans of the Alkali adduce to fupport their Affertion; this in short is the Experiment, wherewith they brow-beat and over-bear those, who deny an Alkali in the Chalybeat

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Chalybeat Waters: And, to fay the Truth, it has hitherto perplexed and confounded many learned and ingenious Men, who, led by the general Observation, that this Syrup is changed by Alkali's into a green, and by Acids, into a red Colour, did not know how to reconcile this Exception, or account for it fatiffactorily, not having confidered the Matter deeply enough; and therefore, yielding up the Point to those that maintain an Alkali in these Medicinal Waters, became Proselytes to this Doctrine, and classed, amongst the vulgar Errors, the Attributing to these Waters the Name of Acidulæ; for which the Ancients have been too lightly accused of Ignorance.

But, as the Mistake of those who impute this Phænomenon to an Alkali in the Mineral Waters, arises from their not rightly distinguishing the Differences in Matter, I will therefore endeavour to elucidate, with all possible Clearness, this Experiment, by shewing the Causes, why this Exception, in Point of Colour, cannot proceed from an Alkali, and by briefly stating the true ones of that green Colour which is produced by a Mixture of the Syrup of Violets with the Chalybeat Wa-

ters.

First, It is well known, that Iron-Vitriol has such a green Colour as the Syrup of Violets assumes, when mixed with Chalybeat Waters; yet, I presume, there is no one so ignorant as to imagine that this Colour proceeds from any Alkali, or even to suspect one in Action,

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Action, when the Acid is so exquisitely pre-

dominant in this Compound.

Secondly, Verdigreese is evidently and positively of a perfect green Colour, manufactured of Vinegar and Copper; but I do not know of any Alkali that is accessary to this Product, though Copper appears in blue Cryst-

tals, when diffolved and cryftalized.

Thirdly, When Aqua-fortis, or any other strong Acid, is poured upon Iron-Ore, it becomes instantly green: Yet here is not any Syrup of Violets in the Case, and supposing an Alkali in the Iron-Ore, yet the green Colour, which the Aqua-fortis expresses, cannot be owing to that, because the Acid is here far superior and predominant; and were there indeed so much Alkali in this Ore, as to occasion this green Colour, it would undoubtedly, on the Aqua-fortis being poured on it, promote or discover itself by an Effervescence, which all Experience is formally against.

Fourthly, But this Question is cleared up, beyond all Doubt, by the Solution of perfect Iron, which yields a green Colour, as soon as dissolved by Acids; and that there is not any Thing of the Nature of Syrup of Violets, or Alkali, in this Solution, for the Production of this Colour, I presume no Body will dispute. Thus we see, that, by various Ways, green Colours may be produced; therefore I think, we may safely conclude, the green Colour in these aquatic Mixtures is essentially and peculiarly inherent to the

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Iron-Ore, without any Affistance of Alkali's, Syrup of Violets, or any Thing of the like Nature.

But, as the green Colour in the Chalybeat Waters is produced by the Syrup of Violets, it is naturally incumbent on me to prove whence this Phænomenon proceeds, and for which I prefume the following Discussion will satisfactorily account.

Syrup of Violets contains an Iron-Earth, and from it may be produced or drawn an

Iron Earth by Art.

The Acid in the Chalybeat Waters is checked or obstructed in its Power and Action, by the Mucilage of the Iron-Ore, which is very probably the only and true Reason of this Mineral Water's preserving its crystalline Clearness, whilst unmixed.

The Syrup of Violets disengages, or sets at Liberty, the Acids and Alkali's, wherever it meets with them, fo that they act upon it, agreeable to their Nature; and therefore this Syrup is the Umpire or Criterion, wherewith to prove or decide the Existence of Acids and Alkali's in the Subjects of Experiment. This Syrup then acts but its natural Part on the Chalybeat Waters, where it difengages and fets the Acid free from that oft-mention'd Slime, the Mucilagium ferri, as may visibly be remarked; for, as foon as the Cha-Wheat Waters are in Mixture with this Syrup of Violets, this flimy Matter separates and fubfides, and the more it fubfides, the stronger the green Colour appears; for then the Acid working CHAP. IV. in England.

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working its natural Effect upon the Iron-Earth, whereby this green Colour is in Course produced, as it always does where it has Liberty to work either upon Iron-Earth, or perfect Iron. And the Acid can so much the quicker and easier perform its Office, as the Iron-Earth in these Waters is already dissolved into Atoms the most minute imaginable; and this I humbly apprehend to be the sole and true Cause, into which this Production of a green Colour is resolvable, from a Mixture of the Chalybeat Waters with Syrup of Violets, which can by no means be owing to any Alkaline Quality in them.

Besides, there remains against this last Supposition another Consideration of no less Importance, which is, that if this green Colour in the Syrup was owing to any Alkaline Quality in the Waters, that Share of Alkali, requisite to produce it, would constitute such a predominant, disproportioned Ingredient in them, as would render it impossible for any Person living to quaff such large Doses of them, as are daily used by Persons of the tenderest Constitutions: Since they must be, in such Case, scarce inferior in Strength to Soap-lees, which is apparently otherwise.

Exper. III. With Galls this Water strikes an exceeding fine Purple, which, with Standing, turns no deeper, than a dark deep-coloured Claret. With Terra Japonica, it turns first Purple, and afterwards Blue. With Log-

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wood gradually a fine Purple. With the dried Herb Veronica, it strikes gradually a Bluish Purple Cast.

Observation the Third.

These are all certain Signs and Proofs of a Chalybeat Water, its natural and genuine Origin: For, was this Water the Produce of an artificial Compound, it would, in Mixture with these Ingredients, strike black and not a purple Colour, a Criterion with which I furnished the Proprietor the Means of satisfying all, who might entertain any Doubt of these really Mineral Waters.

Exper. IV. The Oil of Vitriol occasions in this Water a slight Ebullition; becomes warm, and remains clear. With Spirit of common Salt, it makes no Motion or Ebullition, but occasions a yellow Colour; nor with Spirit of Nitre, Aqua-fortis, Spirit of Vitriol, or distilled Vinegar, but they all keep it clear, and preserve the original Texture.

Observation the Fourth.

From these Experiments we are fully convinced, that there is not any Alkali in the Chalybeat Waters; otherwise they would inevitably with these strong Acids create an Effervescence or Precipitation, which we see they do not, plainly proving that it is the Acid which maintains and preserves them in their Texture; and is yet plainer proved in VII.

VII. and VIII. Experiments, where the Trials are made with Alkali's.

Exper. V. With fweet Spirit of Nitre, and this Water, no Motion or Ebullition whatfoever is produced. The Water remains Crystal-clear, and a great many small globular Bubbles rise and settle on the Sides of the Glass, which renders this Water extremely sweet and palatable.

Observation the Fifth.

This Experiment suggested to me the following Opinion, which seems not unreasonable, that, as this Mineral Water is destitute of elastic or universal Spirits, the Addition of a very small Dose of the sweet Spirit of Nitre might, in several Disorders, be a beneficial and advantageous Supplement.

Exper. VI. Allum being diffolved in this Water, it remains clear, no Motion, nor E-bullition, enfuing. White Vitriol curdles it very much of a yellow Colour; and with Copperas or Iron-Vitriol, it occasioned a great deal of slimy Iron-Earth on the Surface of the Water.

Observation the Sixth.

The Allum not being impregnated with fuch a gross Earth as the Iron-Vitriol, and rather more dissolved by the Acid, unites therefore with this Water, without any Alteration,

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tion; which could not happen, was there an Alkali contained in it.

White Vitriol, being a Compound of seve-veral Metals and Minerals totally opposite to the Iron, occasions therefore Curdling and Clouds, to which the Saccharum Saturni, or the Salt of Lead, is for the same Reason inclined; and the Mucilagium ferri forces the Iron-Earth from the Iron-Vitriol, and drives it to the Surface in a slimy Substance.

Exper. VII. With a Solution of Pot-ashes this Water curdles like Milk, and occasions a Precipitation. With Cremor Tartar it changes to a Milk Colour, and produces a slight Precipitation, but not near so much as with Pot-ashes. Spirit of Sal-Armoniac and Spirit of Hartshorn curdle the Water, and occasion plentiful Sediments.

Observation the Seventh.

There needs not a more certain Proof of the Non-Existence of Alkali's in these Waters, than these last Experiments, which palpably indicate their Acid Quality; and though they do not occasion a visible Effervescence with the Alkali's, the Precipitation is sufficient to convince that the Alkali's meet with nothing that is homogeneous, or hath an Affinity with them. But that these Waters are supported by a Vitriol Acid will be corroborated by the succeeding Experiments, even in so much that when this Water is destroyed by Alkali's, the Acid restores it to a clear State, and its original

Texture:

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Texture: Than which, what can be Proof more evident?

Exper. VIII. The Water, in which the Spirit of Vitriol was mixed, being poured into that with the Spirit of Sal-Armoniac, occafioned a very brisk Effervescence. It did the same with the Spirit of Hartshorn, but afterwards became clear, and the Sediment re-incorporated with the Water again.

Exper. IX. The Water tried by a Solution of Pot-Ashes, being added to that which contained the Spirit of Salt, occasioned a strong Effervescence; but the Water returned clear, and the Precipitate made by the Pot-Ashes, re-incorporated with the Water. That with the Spirit of Nitre, Spirit of Vitriol, and Aqua Fortis, all act in the same Manner.

Exper. X. When Spirit of Sal-Armoniac was poured into the Water that contains the diffolved Alum, it became very much curdled, and coloured like Milk. And when that with White Vitriol is added to it, it becomes thicker, and the Water of a yellowish brown or muddy Colour.

Thus far the Experiments I have made on these Waters; which I would have pushed farther, by procuring an Extract of their Salts, had I not been prevented by the Difficulties of my Situation, which, though little signisicant to the Public, I take Leave to hint at,

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in Hopes of their being a ferviceable Caution to other Artists, who, I wish, may not buy, so dear as I have done, their Experience, of the dangerous Consequences of alarming the Jealousy of Competitors, by any Novelty, or Discovery of Natural Secrets; since the Benefit they are of to Mankind, will not protect the Editors, or Publishers, from the Envy and Malevolence of those, who take every Service of that Sort (not done by them) to the Public, as an Injury offered to themselves, and often resent it, with too much Success and Efficacy, of which (I am forry to say it) I have not been exempted from subscribing a Proof.

The Proprietor of this Well acquainting me too, that this Water had declined confiderably in its Reputation, from the ill Effects fome had found by using it immoderately: It is very eafy to account for it, fince all Chalybeat and Medicinal Mineral Waters are as liable, as any other Medicine, to do good or harm, according as they are judiciously or indifcreetly ordered, or administered; the Direction of which is fo properly, as I have often before observed, the Province of the Physician: And it is really Matter of Concern, that this Place is not regularly attended by a Gentleman of the Faculty, whose Skill and Experience might regulate, and univerfalize more, so convenient a Medicine.

I must farther observe that, as this Water is drank with bitter purging Salts, the common Sal Morabile of Glauber, so often used

for this Purpose, is improper only, from its being fo rarely met with, made up to the Standard of the original Receipt; whereas it is generally adulterated with a cheaper and pernicious Succedaneum. But, Scarborough Salt, prepared after the Method of the most learned and excellent Dr. Shaw, is as good, and a Medicine less liable to be counterfeited, to be used with these Waters. And in the Room of both these Salts, to wit, the Glauber and Scarborough, may be substituted another Salt prepared in the following Manner, and which may be taken to Advantage with the Chalybeat Waters, viz.

" Take common Salt, Quantum sufficit, a-" bout fix or eight Pounds; dissolve it, then " evaporate it to the Confistence of Chryf-" tallization, after which, put it into a con-" venient cool Place for shooting; then " pour the Liquor remaining after the Pro-" duction of the Crystals, into a Boiler, and " evaporate to the former Confistence again, " and continue this fo long, till this Li-" quor will not yield any more Crystals; "then take two Quarts of this Liquor, " to which add of Cremor Tartar eight " Ounces, of Salt-Petre fix Ounces, of clean ec Pearl-Ashes four Ounces, all these sepa-" rately diffolved, and then added to the a-" bove Liquor prepared of the common Salt; " when they are all mixed, add Half a Pint " of Spirit of Vitriol, then evaporate the " whole Mixture to the Confistence of Cryfto tallization; and the Salt thus produced is

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"fit for the abovementioned Purpose, and from two to three Drachens is a sufficient Dose." N. B. This Salt must be prepared in Glass, or well glazed earthen Vessels; for if they are done in Metallic ones, the Acid dissolves them, and not only gives a Second, but also a pernicious Property to the Salt.

That this Water of ISLINGTON is a natural Chalybeat, stands manifest and evidently proved, by the above related Experiments; and in those Cases where the Chalybeat Waters are falutary, those of this Place may, under proper and due Direction, answer the Purpose sufficiently, and is indeed an extraordinary Blessing, to such whose Business or Circumstances will not permit a Journey to Tunbridge in Kent, or any other Spaw distant from this City.

But those that are able to go to Tunbridge, must, upon various Accounts, inevitably find more Benefit than from the Waters of Islington, of which the considerable Change of the

Air is not one of the leaft.

Those that make Use of the Islington Water should take particular Care not to overheat themselves by walking too fast as they go in the Morning to drink them; and when they arrive at the Wells, to cool themselves gradually before they take their Glasses, which ought not to be too large, nor swallowed too quick, but rather kept a little in the Mouth, by which Means, the Stomach is the abler to digest it; and the Exermach

cise,

CHAP. IV. in England. 125 cife, taken between Drinking, must also not be violent.

I might have afforded many other falutary Hints and Directions for the Use of the Drinkers, had it not been for the Impediments before suggested; yet, notwithstanding, should it ever be requested of me, to write a short Medicinal History of this Water in particular, for the Benefit of those that resort to this Mineral Spring for Relief, I will omit no Means or Endeavours to render

it compleatly ferviceable.

Upon Enquiry I find, that in former Ages there have been many religious Wells in England, which still retain their antient Names of the Saints to whom they were held peculiarly confecrated: And the Virtues or specific Properties of these Waters were attributed to the miraculous Gifts, or Endowment of their respective Saints: And in this Persuasion, they were used for many Distempers, and whereas daily Numbers of Resorters received signal Benefit therefrom, they readily gain'd Reputation and Vogue.

One of the most famous of those Wells is, without Doubt, that of St. Winifred, at Ho-LYWELL, in Flintshire, of the Origin of

which we have the following Legend.

St. Winifred had vowed Chastity, but being strongly importuned, and once pursued by a Nobleman of that Neighbourhood, whose Suit she declined, and whose Embraces she slying from, endeavoured to shelter herfelf in the Church where St. Bueno was cele-

brating

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brating Mass; but, before this Virgin could arrive at the Sanctuary she proposed, was overtaken on the Hill near the Church by her enraged Lover, who is nam'd Carradoc, and who, desperate at her Resistance, struck off her Head, which rolling down the Mountain. and at the Place where it stopped, immediately iffued forth the Spring, on which the present remarkable Well is founded, from thence called St. Winifred's Well; and that beautiful Market-Town receives from this Story the Name of Holy-well. Some place this miraculous Event in 644, others in 660; but, to heighten it yet more, is added, that St. Bueno replaced the Head upon St. Winifred's Shoulders, who was thereon restored to Life, and lived fifteen Years after this Accident. In Summer Time, there appear frequently Stones, which feem to the Eye, as if they were besprinkled, or stained with Blood (and fuch I have indeed feen myfelf) which pass popularly, amongst the Roman Catholics, for the Effects of the Saint's spilt Blood.

As to the natural Medicinal Virtues the Waters of this Well posses, they certainly deserve to be more publicly celebrated than they are, being really endowed with excellent falutary Qualities. The Well itself is a very great natural Curiosity, if for nothing more, than that such vast Quantities of Water spring constantly without Intermission or Variation; insomuch that it raises above a hundred Tuns of Water every Minute, of which

which Trial has been made, and confirmed to me, by the concurrent Attestations of feveral Gentlemen of Worth and Diffinction in the Neighbourhood, who had feen the Bason and Well filled in less than two Minutes, which contain at least two-hundred and forty Tuns, the Water being first let out, in Order to try the Experiment: And fuch as have feen this Well, will, I am perfuaded, readily agree with this Account.

The Water of this Well is extremely clear; the Bason is above four Feet deep, yet a Pin is eafily perceiv'd lying at the Bottom: On the Sides of the Wood, and Stones of the Bason, there grows green Moss, which has a grateful fragrant Smell, and is vulgarly called St. Winifred's Hair, which makes likewife Part of the above traditional Miracle. This Moss is frequently applied to ulcerated Wounds, with fignal Success, in the Way of of contracting, cohering, and healing them. Which inherent fanative Faculty cannot be better accounted for than this Moss drawing or collecting from the Water a more than ordinary Portion of the Spiritus Rector, by some called, Spiritus Mundi, or Spiritus universalis, by which is to be understood that vegetating Power imbibed by the Air, which maintains and furnishes the Principles of Growth and Life to the whole Vegetable and Animal Kingdoms; which there are various Processes in Chemistry, besides this natural Way, to come at, collect, and fix, as may be more at large feen in the Che-

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mia Experimentalis of Dr. Johannes Helfricus

Jungken, Page 356.

Hence there is great Reason to conclude, the Water of this St. Winifred's Well is copiously impregnated with this universal Spirit of a powerful Medicinal Efficacy; then consequently it cannot but be complicated

with this falutary Principle.

It is void and clear of all gross Earth, or Mineral Contents; which is so much the more remarkable, as this Spring arises in the midst of Hills and Mountains, plentifully abounding in Minerals and Fossils. It is then such a Water as may properly be called, a simple light Water, destitute indeed of Mineral Contents, especially such as are commonly met with in the Medicinal Mineral Waters, but abundantly inriched with the Spiritus Rector Mundi, or Universal Spirit.

For many Reasons I therefore esteem it preserable to the Bristol Water, that is sold

here in Town.

This Holy-well Water was never, to my Knowledge at least, made any Use of as an inward Medicine by Drinking, but for a cold Bath only; yet, from its pre-deduced spiritual Contents, there is no Room but to conclude, that this Water might, with a proper Regimen and Method, be drank medicinally, and in many chronical Disorders produce the most falutary Effects, especially to the fair Sex, in the Cases of Obstructions occasioned by Hysterics, or where the Mass of Blood from that or any other Cause is be-

come

come thick and fizy; which breeds in young Women a Sluggishness, Heaviness, pale Colour, Pains in the Loins and Groin, and in general, a Depravation of all the natural, vital, and animal Functions: In fuch Cases, I dare aver, that this Water, on the Account of its exceeding fine Spirits, would refolve and carry off the spontaneous Matter incident to stagnating Blood, by promoting the natural Evacuations, and restore the vital Juices to a healthy, natural Circulation, fo as to fpeed a perfect Recovery. And though Chalybeat Waters are recommended in these Cases, especially for strengthening the Tone of the weakened Vessels, yet, I cannot help preferring this Water, as more bland, more fafe, and less liable to occasion a constitutional Revolution, which is fometimes attended with dreadful Consequences, and makes it so indispensably necessary for the Chalybeat Waters being administered with the utmost Care, Caution, and under the best Medical Regulation: But fuch violent Consequences are not to be dreaded from the Water of St. Winifred's Well, in Case they should be used Empirically.

Such as are come to that critical Stage of Life, in which their Menses leave them, ought to be extremely careful to prepare and put their Blood into fuch a State, as may guard their Health against the notorious ill Consequences that so often ensue from this natural Revolution, fuch as schirrous Tumours, and cancerous Ulcers in the Uterus or Womb, and

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by Confent of Parts, in the Breasts, to which the Seat of Harm is frequently and fatally translated. Bathing then in this Well, and Drinking properly this Water with moderate Bleeding or Cupping, would, in my Opinion, be one of the safest, best, actual, or preventive Remedies they could make Use of; and therefore I tenderly recommend it to such as have Reason to apply to it, or can conveniently do it.

Nor are perfuafive Precedents wanting to fupport this Recommendation; fince fuch light, pure Waters as this at Holy-well, are used or drank, with great Success, in several Maladies, to which they prove salutary Medicines. And both in Germany and France, there are Wells containing Waters of this Sort, that are held in the highest Esteem, which they deserve for their singular Virtue

and Efficacy.

To my particular Knowledge, in Germany the Medicinal Fountain at Schleusingen, in the County of Henneberg, those at Bebra in Thuringen, that at Osterode on the Hartz, contain no other than a simple, light Water, and like this of Holy-well plentifully supplied with the Spiritus Rector, without any other Contents of the Fossil or Mineral Kinds; and with which alone they have signalized their Essicacy against the Stone and Gravel, Rheumatism, Scurvy, Phlogistic Sizeness of the Blood, Obstructions of the Menses, Hæmorrhoids, &c. and are, to this Day, the Resort of Nations, on that Account.

The

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The Benefit of cold Water Baths, in feveral Distempers, being too well known or established to need a Repetition here, I shall only observe, that, as on the Goodness of the Water the Success of the Remedy so fpecifically depends, that there cannot be too exact a Choice made of it: And this Holywell cold Bath, having the Experience of Ages, and a Series of innumerable authentic Cures on its Side, worked upon the most stubborn and malignant Diseases, such as Leprofy, Weakness of Nerves, and other chronical inveterate Disorders; of which there subsist undeniable Records, Traditions, and living Witnesses; these Considerations on the whole form a just Recommendation of it, as a cold Bath of the first Rank, independent of the farther Advantage, which may be obtained by a regulated Regimen of Drinking, or Taking the Water inwardly. Such then, as have the cold Bath prescribed to them, can hardly do better, if their Circumstances will permit them, than to feek their Remedy at a Place, that could not have established such a Reputation, without actual and well-attested Merit.

For though this Holy-well is fituate in the most remote Part of the Kingdom, in NORTH-WALES, the tried and approved excellent Qualities of this cold Bath, and the eminent Cures it has performed for a Succession of Ages, and still daily continues to perform, have drawn such a Resort to this Place, that from a few Cottages it originally K 2

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confisted of, it has increased to a Market-Town, composed of good commodious Buildings, sufficient to accommodate Personages of the first Distinction.

There are also many other collateral Advantages towards restoring Health, pertaining to this Place.

The Sea is not above one measured Mile distant; so that such whose Cases require Seawater or Salt-Water Baths, may be easily

supplied.

It is likewise a Mineral Country all round, and in the Time I resided there, I discovered two or three Springs of excellent Chalybeat Waters, which if compassed, and collected into proper Recevoirs, would, doubtless, more universalize this greatest Gift of Nature towards the public Health, which so well deserves a grateful Cultivation, and Attention of the Country they are found in, to render the Blessing as diffusive, as easy, and commodious as possible: To which, the remarkable Healthiness of the Air of that Place is another inviting Encouragement.

It would too much exceed the Limits I have fet myself, to enter into a more circumstantial Detail of all the signal Advantages, with which Nature, under the Favour of God, has endowed this justly celebrated Place, and its Neighbourhood, towards the Recovery especially of chronical Complaints: But my tender Regard for the public Health makes me wish, that the Chalybeat Springs I have above taken Notice of, may be looked into, verified.

verified, and with due Care disposed into proper Recevoirs; towards which, it would be necessary, that an able Hand of the Profession, should accurately examine the Mineral Contents of these Waters, and connecting his Report of them, with a full Account of all the other Advantages and Benefits to be hoped for, from a Refort to this Place, with proper Directions for the Patients to govern themselves by. Such a natural History might thereby be formed of the whole, as to be of the greatest Service, by pointing out to the Public a Place fo compleatly fitted with every Sort of Water, pure, mineral, or saline, that can be prescribed for the Prevention or Cure of Diseases, and situate in an Air, which of itself, would be a powerful Restorer in many Cases.

There is also another Mineral Water of a peculiar and falutary Nature here in England, which is called the NEVILLE HOLT SPAW between Harborough and Uppingham in Leicestershire, which stands Exportation, and is fold here in London, in Salop, Nottingham, Sheffield, and many other noted Places in this Kingdom. It is a purging Water, and has done great Good in many stubborn chronical Difeases. I never indeed made Experiments with this Water, but its Contents are fufficiently afcertained, and made known by the most learned and ingenious Dr. Short, in his Mineral Water History. And I may also refer the curious Reader to a particular Difcourse on the Nature and Uses of NEVILLE HOLT

134 On several Mineral Waters.

HOLT Water, collected by feveral Hands,

and published in the Year 1742.

My worthy Friend Dr. Short has informed me, that, fince these Publications, he has not made any fresh Experiments on this Water, except the last Summer, after the moist and rainy Winter, 1746, when, on Trial whether this Water had not suffered by the Rains, he evaporated two Quarts, by which he found, that it was as rich in Mineral Contents as ever, and not in any Degree altered, or lessened in the Quantity of its salutary Ingredients.

To do it then Justice by all that I can learn, that this Neville-Holt Water is very much esteemed in the Practice of Physic; and I am credibly informed, that it is even preferable to those of Pyrmont and the Poulon Spaw, in those chronical Cases, wherein these latter are prefcribed and used; which seems very reasonable, as they are removed out of their respective Climates, and pass the Ocean itself: And both Reason and Experience concur, to establish that natural Medicines are more salutary to the Natives of the Country they are found in.

But, for more particular Directions and Observations on the Medicinal Use of this excellent Water, and the Specification of the Diseases, they are most serviceable in, I must again refer to the afore-mentioned Pamphlet of 1742, wherewith I conclude this Chapter.

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CHAP. V.

Of that most extraordinary and remarkable Mineral Water at Shadwell, commonly called the SHADWELL SPAW near London.

T Shall now proceed to the most remarkable Mineral Water Concrete that ever I have feen or heard of, which is that of SHADWELL SPAW, in Sun Tavern Fields, in the Parish of St. Paul's Shadwell, the Property of Walter Berry, Esq; the Discoverer thereof. And as the Discovery was intirely accidental, I shall, First, touch upon some of the various Ways whereby this great City has been anciently supplied from Springs, and the Causes of their Difuse; as what may perchance give fome Light to diffinguish, whether this particular Water was now first found out, or only recovered. Secondly, I shall relate what unforeseen Means Providence has blessed us with, by the first Discovery or Recovering of this-Water, just at the Mouth of this great City, where it is so much wanted. Thirdly, I shall relate the Experiments I have made on it, and from thence draw fome indifputable Corollaries, to prove that it is a natural Product, and no artificial Composition, so as to obviate the Principles of its Medicinal Efficacy. And, Laftly, illustrate the whole with a Relation of undoubted Facts or In**ftances** K 4

flances of many extraordinary and uncommon Cures, which this Water has performed.

First, London has always been happily fupplied, not only with the noble River of Thames, but with many other clear and wholefome Springs of Water; from whence feveral Parts of the City and Suburbs derive their Names: Many Streets, and other Places, being distinguished by the Terminations of Bourns, Brooks, Pools, Wells, Conduits, &c. which not only fupplied the Inhabitants in their common Occasions, but were some of them beneficial in restoring their Health, or relieving their Infirmities; though fuch as were Medicinal, might anciently, in the Days of intellectual Bondage, be not a little robbed of their real Merit, in having the Cures they performed miraculoufly attributed to the Worship of these Saints, whereunto many of them were dedicated, by fuch Catholic Friars, whose Interest it was, to drive on the fanctified Traffic, and impose a religious Excise upon those, whom they had trained up in fo much Ignorance and Superstition, as to contribute thereto.

But in the Days of Queen Elifabeth, when the Citizens began more unanimously to supply their Houses by subterraneous Conduits; and that great Work of bringing the New River, twenty Miles, from Hertfordsbire, for this Purpose, to accommodate the Northside of the said City, as the Thames does the South, was compleated in the next Reign,

near

by the indefatigable and public-spirited Sir Hugh Middleton; then many of those little Brooks and Wells, Conduits and Cifterns, were neglected, stopped up, and quite broken down. John Stow, the Antiquary, who died a very aged Man, in 1605, has, in his Survey of London, a distinct Chapter, wherein is defcribed twenty or thirty of these Wells, Brooks, &c. But this, we are speaking of, the most fingular and remarkable Water of them all, is not mentioned, unless it lies veil'd under a different Name. Many of the Springs and Wells were so anciently observable, that William Fitz-stephens, a Londoner born, and a Monk of Canterbury, who died in the Reign of King Richard I. Anno 1191, as may be feen in John Leland's Book of British Writers, John Stow's Survey aforesaid, and Dr. Thomas Fuller's Worthies of England, mentions the chief of them; where, in his short Description of London, under the Chapter De Fontibus, he fays: — "Near this City, in the Suburbs on " the North-fide, fome special Wells, of " fweet, wholesome, and clear Water, stream-" ing forth among the glittering Pebbles, of " which, Holywell, Clerkenwell, and St. Cle-" ment's-well, are most famous, and frequent-" ed by Scholars and Youths of this City, in " Summer Evenings, when they walk forth to " take the Air." - From hence it is plain, by the Colour, the Taste, and the Resort, that they were mild, palatable Waters, repaired to for Pleasure, not for Medicine; and yet had there then been fuch a Medicinal Water known fo

near Holywell, as this at Shadwell is, being but a few Fields distant, I cannot believe but that Author would have mentioned it, as well for the Variety, as the Excellency of it, notwithstanding the much regretted Brevity, to which he has confined himself. As for Holywell and St. Clement's-well, they might, by their pious Appellations and Patronage, inspire a useful and profitable Reverence in those who partook of them, under the Direction aforefaid; but I cannot learn that there was any Thing Medicinal or Mineral in their Composition: Perhaps they were not then curious to enquire into natural Causes, at least not publickly, as all Efficacy was religiously accounted for. I have been credibly informed, that the former of them was a good, light, wholesome Water, plentifully impregnated with the Spiritus Rector; and, upon that Account, with perhaps a little spiritual Legerdemain, it might be poured out to the Populace, as a supernatural Nectar.

But it is not improbable that some of these Wells, even in those Days, were mere Tippling-houses and Assemblies of Entertainment, as well as in ours: For Clerkenwell was, three or four-hundred Years since, frequently repaired to by Clerks and Priests; where to draw Company to them, and some Expence or other from them, no Doubt they used to act pious Plays, and religious Interludes; as at Sadlers-Wells, and many others, they act,

at this Day, those that are not so.

As for Shadwell, it is as probable, that this was fo called from fome Water too, as by its own Name is also implied; but if it had been one fo extraordinary as This, the constant Good it was capable of doing, would have kept it continually open, and in Use: Some Knowledge of its being reforted to would have descended to us, and the Reputation of its Cures would have been treasured in Record: But, as I yet met with no fuch Intelligence, I shall, till my Knowledge is corrected with better Information, be rather inclined to believe this Shadwell-Spaw was now first discovered than a lost Water, now only retrieved: Whichfoever it is, I doubt not but my grateful Endeavours to preferve the History of its present Discovery and Virtues, in the following Narration, will kindle a Defire in others, who shall hereafter, upon further Trial and Experience thereof, more equal to its Merits, to enlarge upon, and celebrate the fame.

Secondly, This Shadwell Fountain is about two Miles Eastward from the Tower of London, and about half a Mile from the River of Thames, or Shadwell-Dock Stairs, ascending from thence all the Way to the Top of a Hill, where is a Field of a triangular Form, called the Sun-Tavern Fields, on the Eastern Side of which, we find our Medicinal Fountain, called the Shadwell-Spaw.

This Field (which at this Time is a Rope-Walk) was higher than it is at present; be-

cause

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cause it has been dug away at least ten Feet deep to supply Ballast for Ships, and probably never would have had any Well dug there, if the Dispute with the Parish of Shadwell and the Proprietors of the Thames Waterworks had not happened, the Particulars of which are thus:

In the Year 1734, Mr. Berry was Churchwarden of that Parish, and there was a Waterwork erected, to raise the Thames Water for the Use of the Inhabitants in those Parts. The Proprietors thereof were called by the Name of the Governor and Company of Shadwell Water-works. This Body of Men had not paid, for near twenty Years, to the King's Tax in that Parish; and if they were rated to the Poor, as the rest of the Parishioners, they would pay but as they pleased: Being an incorporated Body, all the Parish Officers, before Mr. Berry, were afraid to meddle with them; but when he was Churchwarden, the Parishioners applied to him, that they might be obliged to pay their Proportions: Accordingly he cited them into the Bishop of London's Court, and after a Year's Contest, a Sentence was obtained against them. Then they removed the Cause into the Archbishop of Canterbury's Court, and there no better Success attended them, for they were cast in that Court. The Consequence of this Decifion at Law was Revenge upon the Profecutor: So that in two or three Days afterwards, the Company caused the Thames Water to be cut off, not only from Mr. Berry's House,

House, but the Houses of fourteen or fifteen of his Tenants. To repair this Diftress, he was put upon Digging this Well, which is now called THE SHADWELL SPAW in Sun Tavern Fields. He employed the most experienced Man in these Operations, that was in London; and in Digging they observed that the Surface of the Ground was a common Earth; after they had got about five or fix Feet down, they came to a Gravel of a good deep Yellow, and after that, to a rough hard Ballast, which was difficult to dig up, and was as coarse or lumpish as Washballs: Under this they came to a Rock, which as foon as they broke through, up fprung the Water, as strong, as if a Main had been broke in the Tree; that is, as I understand my worthy and communicative Correspondent, the Proprietor of the Well, to whom we are beholden for this authentic Account of it, as if the main Trunk of the fubterraneous Tree, or great Pipe, had burst, which branches forth into the other Pipes that fupply the Houses with Water. The faid Proprietor had, before this Contest, lived above twenty Years in his House, but never heard a Word of any Water near him, that had any extraordinary Properties; and if his Opponents had not deprived him and his Tenants of the common Water, the Public might never have had the Benefit of this Medicinal

The first Experiment that accidentally happened with this Water, was upon a Boy belonging

longing to one of Mr. Berry's Tenants named Robinson; who, being very hot at Play one Day, and having drank plentifully of the Water (foon after the Pump was first put down) went Home fick, and fell a Vomiting to an exceffive Degree; whereupon the Boy's Mother being frightened, came to Mr. Berry, and asked him, What was the Matter with his Water? And told him what Effect it had upon her Son; upon which, Mr. Berry called for a Glass of it, and, having tasted it several Times, was fomewhat furprized at the extraordinary Flavour of it (for he had never tasted it before) but he perfuaded the Mother not to be uneafy, for as he had so plentifully difcharged it, she might be satisfied it would do him no Harm. Some Time after, Mr. Berry having a Horse of his own, which by some Accident or other, was almost blind, and daily growing worse and worse; and having heard what Effects his Water had had upon others, as well as the Boy, refolved to try whether it might not be of some Service to the Horse, which he accordingly did, and with the utmost Success; for having washed the Horse's Eves with the Water for some Time, he at length, perfectly recovered his Sight.

This is all that I can learn of the first Discovery and Physical Use of this wonderful Water; but its Medicinal Efficacy was much sooner known by the Poor, and lower Sort of People, than by the Proprietor himself; and it was upon the Account of the extraor-

dinary

dinary Refort of such sick and afflicted Persons, that the Proprietor inclosed this Well, and also erected a Pump and Bathing-house. But what induced People at first to make a Medicinal Use of this Water, I am not yet able to learn, except its Fame arose upon the successful Evacuations, which happened to the before-mentioned Boy.

I shall now proceed to the Experiments I made on this Water, which I began on the 29th of June, 1748, the Day warm and serene, and I was at the Well by Six o' Clock in the Morning.

I. This Water is of a light Yellow, nearest the Colour of French Brandy; sparkles when poured into a Glass, like a fermented vegetable Juice, such as Cyder, &c. and tastes very adstringent: Thence the vulgar or improper Expression, that this Water of Shadwell tastes of Allum.

II. A Glass full of this Water exposed in the open Air, where the Sun-Beams have full Power, occasions no Sediment, or any other Alteration whatever; loses not its Taste, or the evacuative Power it has, when taken in-

wardly.

III. A Pint of this Water, taken in the Space of half an Hour in two Doses of about half a Pint each, will, on a moderate Exercise of Walking, work a gentle easy Vomiting, and two or three mild, unstrained Stools.

IV. With Powder of Galls this Water strikes instantaneously a fine deep blue Colour,

without first striking it into a purple.

V. The Water thus by Virtue of the Powder of Galls changed into a fine deep blue Colour, affused to Water of this Fountain containing or mixed with one Fifth of Oil of Vitriol, the Galls will subside in their primary original Colour; the Water will also come to its first natural Colour again, and no Symptom or Sign remain of the deep blue, occafioned by Galls.

VI. If any greater Quantity of Galls is added, or mixed with the Water that contains the Oil of Vitriol, there enfues not any Alteration in Colour or otherwise, both the Powder of Galls, and the Water preserving

their natural respective Colours.

VII. About a Tea-spoonful of Shadwell Water will, in three Ounces Insusion of the Herb Veronica, strike a deep brownish opaque

green Colour.

VIII. Equal Parts of Shadwell Water, and Infusion of the Herb Veronica, will strike, or occasion a very fine transparent Olive-green Colour.

IX. The Herb Veronica dry, mixed with this Water cold, without warming it, will in 24 Hours Time, strike or promote the respective Colours, as related Experiments VII. and VIII.

X. This Water, with the Powder of red Sandal or Dye-wood, admits very little Alteration, only rubifies a little.

XI. The

XI. The Infusion of Green-Tea with the Shadwell Water, strikes first a green, and in Conclusion, a brownish Colour, retaining somewhat of the first green.

XII. With Syrup of Violets this Water strikes

a deep muddy green Colour.

XIII. With Terra Japanica, it instantaneously strikes, or gives a very deep brown Colour.

XIV. With French Brandy, it strikes a blue, and ultimately a deep brown agate Colour.

XV. This Water mixed with Rum, is thereby, however faintly, inclined to a pleafing light Green.

XVI. With common Gin, this Water strikes

a fine white pearl Colour.

XVII. Acet. distill. or distilled Vinegar, mixed with the Shadwell Water, keeps it of its original Colour, causes no Effervescence, Precipitation, or other Alteration whatever, except that it promotes pearly Air-globules, to settle on the Edges and Sides of the Glass.

XVIII. A Solution of Copperas, or Iron-Vitriol, causes no Alteration, or any Distur-

bance to this Water.

XIX. A Solution of Allum occasions not any Motion or Disturbance in this Water, but

rather makes it more clear.

XX. With this Water and Aqua-fortis, no Effervescence, Motion, Precipitation, or any other Change occurs; besides an Alteration of its natural Colour to that of a most clear Crystal.

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XXI. With Oil of Vitriol, this Water also remains in a seeming tranquil State, occasioning at least no discernible Motion, but that of the pearly Globules sticking to the Bottom and Sides of the Glass.

XXII. To four Ounces of Shadwell Water, add one Ounce of Oil of Vitriol, and it will render it as hot as the Toeplizer natural hot

Springs in Bohemia.

XXIII. One Scruple of Soft Brimstone, in which the Phlogiston is a very little destroyed, by which Means, it is made fost, makes a Pint of Shadwell Water full as hot, as the Waters at Aix-la-Chapelle.

XXIV. A Solution of white Vitriol causes not any visible Alteration in the Shadwell

Water.

XXV. With Spirit of Vitriol, this Water fuffers no Changes, except its growing rather almost Crystal clear, and settling those pearly Bubbles on the Sides of the Glass; as observed in Experiment XXI.

XXVI. This Water with Spirit of Nitre, agrees exactly with the foregoing Experiment (XXV.) but does not render the Water quite

fo clear.

XXVII. Spiritus nitri dulcis, or the sweet Spirit of Nitre, occasions not any Effervescence, or any other Motion or Action what-soever with this Water, besides that of destroying its natural Tincture.

XXVIII. The Spirit of common Salt preferves the Mixture of this Water entire; fo that its

Texture

Texture fuffers no Alteration, but changes its Colour into a lively Parrot Green.

XXIX. With Cremor Tartar this Water strikes a beautiful yellow Colour, like that of the finest Couslip Wine, and even in the Smell is not unlike it.

XXX. The Lixivium of Cremor Tartar acts in the same Manner on this Water, as the Cremor Tartar itself, as deduced, Experiment XXIX.

XXXI. Ol. Tart. per deliquium causes a strong Precipitation in this Water, which is first of a strong yellow Colour; but when this Precipitate settles, it becomes of a fine clear Amber Colour.

XXXII. Pearl Ashes occasion a Precipitation in this Water, but not of such a beautiful yellow Colour, as related in Experiment XXXI, by inclining it somewhat to Red, almost like Roach-Allum.

XXXIII. The Lixivium of Pearl Ashes precipitates this Water, so as to make it of two Colours, the lowest of a brownish, the uppermost of a yellow Colour.

XXXIV. With Spirit of Sal-Armoniac it occasions a considerable Cloud, and instantly succeeds a Cuticle on the Top of the Water, coloured like the Peacock's Feather: The Cloud is coloured like the Balsam of Tolu, and almost as transparent; this Precipitate gradually subsides, then the Water becoming clear, but the Cuticle remains on the Top.

XXXV. Spirit of Hartshorn occasions a yellowish brown Precipitate, which manifestly

festly proves and demonstrates, that there is nothing of Copper in this Water.

XXXVI. Sal. Volat. Alkali, or volatile Salt of Alkali, precipitates this Water yellow, as

also other fixed Alkali's.

XXXVII. When this Water is evaporated, the Sediment that remains is always of a beautiful light Cloth yellow Colour, nearly refembling the pale Colour of Gall-stone, in which the Salt of this Water partly remains; and in this Process, the Steam of the Water causes no Smell, more than that of common Water.

XXXVIII. In the Bath-house belonging to this Well, the Steams of this Water generate a Hali Nitrum on the Wall, which is not however a perfect Nitre; tried by the Fire, it acts almost like Sal medium magis terrestre, or like unrefined Borax.

XXXIX. Oil of Vitriol turns this yellow Earth, or Sediment, into the Colour of Iron-Ore.

XL. This Earth reverberated in a Crucible changes its Colour to that of an Iron-brown Colour: It loses also in Quantity. The Phlogiston is perceptible in this Operation; and the Flores which arise, are white, and in every Respect like Flores of Antimony.

XLI. The Magnet attracts the brown Earth

remaining in the Crucible.

XLII. The Salt I made out of this Water, was a perfect Borax; but as the Method whereby I obtained the faid Salt from this Water, may not occur to, or may be mistaken

by others, who shall attempt the Extraction after me, I close this List of Experiments, by communicating a Process, whereby any one, the least versed in Chemistry, may manufacture an identical Borax out of this Shadwell

Spare Water.

" Take a Gallon of Shadwell Water, in " which mix one Pound and a half of Ful-" ler's Earth; pour this Mixture into a Re-" tort, and fet it in a Sand-heat for eight or " ten Days, but be careful to keep under it " a constant Fire both Night and Day, and " yet not so great to raise the Water, or cause " it to distil; and, for that Reason, you " must have a Receiver luted to the Retort, " that if any Water should come over the " Helmet into the Receiver, you must pour " it back into the Retort again; and, on this " Account too, the Receiver must be very " well luted to the Retort to keep out the " external Air, fo that the Water may ex-" hale imperceptibly through the Pores of " the Glass, till the half is exhaled away. " Then add half a Gallon of Shadwell Water, " and give it a strong Fire, that it may foon " be boiling hot, and put into it three Ounces " of Sheeps Suet, three Ounces of Hogs-lard, " and one Ounce of Oil of Olives; when these " are in the Retort, stir them well with a "Stick, till the Fat is diffolved, and all well " mixed together; but whilst you are doing " this, keep out the external Air as much " as possible, and then lute on the Receiver " to the Retort again, and flacken the Fire, " main"maintaining no other Degree of Heat, than what you exhaled by the first Water half away: And in like Manner you must continue the Fire, till you exhale imperceptibly all the Water out of the Retort, and the remaining Matter in the Retort contains the Salt or Borax. This must be lixiviated out, and crystalized in the same Manner as East-India Borax is refined here; an excellent Process of which is set forth by the ingenious Dr. Shaw, in a Note on the Article of Borax, in his Translation of Dr. Boerhaave's Chemistry."

Thus far the Experiments made on this Water, from whence I shall attempt to draw a few Confectaria, or Corollaries, by Way of farther Illustration.

Corollary the First.

It is plain, that this Water contains an adfringent, austere, and acid Taste, implying what, according to all Medicinal Rules, is a very singular Property, answering many valuable Purposes; specifically in Cases where there is a Cohesion wanted, or to draw the elementary Particles of the Fibres nearer to each other, thereby bracing them more sirmly: Or to suppress and stop the Hæmorrhages, or Essusion of Blood issuing out of broken Vessels, by contracting or cementing the Mouths of them, or by coagulating the essuant Blood, so as to close their Orifices;

for the Particulars of which Operation *, it is not here the Place to discuss, but only to point out the Virtues of this Medicinal Water from its adstringent, austere Acidity, which manifests itself on Trial, as mentioned in Ex-

periment I.

The Diffempers however, where a Cohefion or Drawing of the elementary Particles to each other is wanted, are many, fuch as all weak and lax Fibres, Nerves, Sinews, Tendons, Membranes, and in short every Part of our Body that is inclinable to a cuticular Nature, and of Course liable to incur a State of Laxness or Debility: Even a common Cold is a Laxation, and Weakening of the nervous and cuticular System in the human Fabric; and this Distemper is absolutely the Fore-runner of many mortal Difeases. Now as the most effectual Remedies against dangerous Colds are acid, austere Fossils; most rational it is to suppose that this Shadwell Water, containing fuch a Portion of their inconcrete and feminal Principles, must more powerfully counter-work fuch Diseases, than any Preparations of them, by the most exquisite Prescriptions of Art: Therefore, I cannot but think it highly recommendable in all Cases of Colds, ordinary or severe (nothing else in the Constitution forbidding their being taken) as a highly valuable Medicine in a Disorder almost universal, at one Season

^{*} See Dr. Van Swieton's Commentaries on Dr. Boerhaave's Aphorisms, Sect. 28 and 218, and Dr. Simpson's Hydrologia. Chemica, Page 69.

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or another, to the Inhabitants of this immensely populous City, and inconstant Climate.

Corollary the Second.

In those Cases, where adstringent Medicines are required, they should be administered with due Measure and Regard; otherwise, if used immoderately or injudiciously, they may create opposite Diseases from too strong a Cohesion, or rather Attraction: therefore proper opening Remedies are not only permitted, but at proper Intervals, necessarily required. And this collateral Virtue obtains peculiarly in this Water, fince it is at the fame Time both an easy and safe Emetic or Cathartic, as may be feen in Experiment II. and III. Yet we have Experience and unqueftionable Authority on our Side, that this Water has performed its Function, in Quality of a most efficacious Adstringent, when, at the same Time, it caused the above-mentioned Evacuations, as will be more fully explained hereafter.

It may be thought some Disparagement or Disadvantage to these excellent Waters, that they treat the Patient at first a little too roughly, in their various Operations, not only as equally Cathartics and Emetics, but even somewhat diuretic. But this Objection of Delicacy to their Use, which may be chiefly expected from the fair Sex, will weigh very little against their salubrious and admirable Efficacy in many Cases, and those the worst

that

that can endanger or invade the human Syftem.

This Water, then, ought absolutely to be confidered, as a fafe and powerful Evacuant; and certainly for Virtue and Expedition greatly challenging the Preference of any artificial Medicines, or Compositions of the Shops. In this Country especially, such a Water may pass for a rich Dispensation of Providence to its Inhabitants, amongst whom a Fulness of Living, and all Sorts of Luxuriance in Diet. are so apt to create the Disorders of a Plethoretic Habit, for which these Waters cannot but be of excellent and fovereign Use: agreeable to the Aphorism of an Author. who, having studied the Simplicity of Nature, is an infallible Guide. My learned Reader already knows, that I mean the everrespectable HIPPOCRATES: Quicunque morbi ex repletione funt, eos evacuatio sanat, & quoscunque ex evacuatione repletio, Sect. II. Aph. 22. In English thus: "The Diseases which " are bred by Repletion, Evacuation cures, " as Repletion does those bred by Evacua-" tion."

What I have already faid of the Adstringency of these Waters, may, prima facie, perhaps appear inconsistent with their laxative Qualities; but, the Fact being establish'd on indisputable Tests, I shall, without entering unnecessarily into the Analysis of the Causes, only remark that so singular a Re-union of two seeming Contrarieties, in which the one is a Corrective of the other, without weaken-

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ing each other's Power and Effects, forms one of the strongest Recommendations of the Virtues of this Water to public Use and Experiment.

Corollary the Third.

That this Water is a naturally medicinal One, without any Interpolition of Art, is verified by Experiments, from the IIId to the XVIth. Since such a Variety of Phenomena cannot be produced by any Remains of an old Copperas or Vitriol Work, or by Sea-Coals, that could be in this Place corroded, or wasted, whereby the Water might be impregnated, that we drew at the Well.

I own that these are the Suggestions of some Gentlemen now living; but they may easily convince themselves of an erroneous Diffidence and Decision, if they will please to consider,

First, That all Copperas or Vitriol Works are ever founded as near navigable Rivers, as they conveniently can be contrived; that Coal-Pyrites, or Copperas-Stone, or other Stores requisite for such a Manufacture, may be the readier supplied: It cannot therefore be reasonably suggested, that, seeing this Well is on the Top of an Hill, almost a Mile distant from the River Thames, any one would have erected a Manufacture under such an obvious Disadvantage, when actually there are, and always did exist more convenient Places for

fuch a Purpose, on the Banks of the said River.

Secondly, That in such Works, when they have Need of Rain-Water, they have certain Machines, wherewith they work the River-Water, by dispersing it through the Air, in such a Manner upon the Pyrites, that it becomes mild, and almost of the Nature of Rain-Water; and as only River-Water is sit for this Purpose, consequently, they could not be supplied so conveniently with it, upon so rising a Ground, or Hill, as that in Sun-Tavern Fields, where we now meet with this medicinal Water-Fountain, called the Shadwell-Spaw.

Thirdly, Had there ever existed any Copperas or Vitriol Works or Manufacture, where now stands the Shadwell-Spaw, we should undoubtedly have met with old Wells, especially as this is a Business, wherein much Water is required; but we find not the least Vestiges of such old Wells, Reservoirs, or the like Apparatus; nor would there perhaps have any Well been sunk there now, but for the mere Accident of a Contest between Mr. Ber-

ry and the Water-Works Company.

Fourthly, If this Water was the Product of the Remains of an old Vitriol Work, or of corroded, or wasted Coals; the Labourers, in digging this Well, must have hit upon some Remains, Signs, or Indications thereof, which it is certain they did not; but met first with a common Earth, then Gravel, Ballast, and

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at last with a solid Rock, out of which the

Spring iffues, or streams forth.

Fifthly, Had there been any sufficient Remains of old Vitriol or Copperas Works, to tinge the Water-Spring to its present Pitch, or Condition of Appearance; the whole Earth thereabouts would be imbibed with corrosive Ingredients, very unfit for the Use of it to ballast Ships, to which such a Material would prove very destructive: but of this we hear not the least Complaint, and are in Course well assured of the Negative of such pretended Remains, since the whole Field, or Hill, has been dug away above ten Feet, for this very Use.

Sixthly, Had there really ever existed such a Vitriol or Copperas Work, or decayed Coals buried, or covered in a Rubbish-Mass; it is not to be supposed, or reasonably imagined, that such Remains would have penetrated through the Rock, out of which this Water streams; it is therefore contrary to all the Laws of Matter, and common Sense, to trace this Water's Origin, or Birth, to such an un-

warranted Foundation.

Seventhly, But suppose, for Argument Sake, that this Water was impregnated with the Sea-Coal, thus pretended to be buried in Rubbish, and owed its peculiar Taste and Qualities thereto; would not, by an equal Parity of Reason, the Water found in other Coal-Mines resemble, or approach in some Measure to those of this Water of the Shadwell-Spaw? Whereas none are found in any of the nume-

rous Coal-Mines which this Kingdom, or indeed, any other Country possesses, to resemble it in Taste or Properties; but none such are at least hitherto pretended to be discovered.

The Waters of a Coal-Mine are generally brackish, fixetid, and nauseating to the Smell; containing a strong Vitrioline Acid, insomuch that they will occasion a vehement Effervescence with Alkalies: Qualities, that it is evident to Sense and Experience, are inconsistent with those of the Shadwell Spaw-Water; which cannot either owe its Properties to any Connexion with Fossil-Coal, or the Corruption of it, since Coal in any State promotes or occasions a Water of no other Nature, than what we find in the Coal-Mines.

Eighthly, The Suggestions too of such, whether innocently, or with Defign to decry these Waters of Shadwell, aver them to be an artificial Contrivance, are readily refuted from the Experiments above recited, and the Conclusions naturally deducible therefrom; which to a Judge of the least Candour, Knowledge, or Impartiality, establish the Negative of this Water's being a fictitious Composition beyond Doubt or Controversy. But, were not Proofs and Experiments superior to all Respect of Persons, it might be added in Confirmation of the Genuinness of this Water, that the Proprietor of the Spaw is a Gentleman of a fair and honest Character, in the Commission of the Peace, for the County of MIDDLESEX, and by all Accounts far superior to the Suspicion of brewing an artificial medicinal Water, and imposing such a spurious Composition on the Public, in a Case so sacred as that of Health: But between the Diffidence, natural to un-examining Ignorance, and the interested Envy, or Competition of others, the most useful Discoveries have mighty and opulent Adversaries to struggle with, before their Merit engage the Public Faith and Attention to them, if their applican O

Ninthly, Thus, even the bare Word and Affeveration of the Proprietor, when (I fay) his Character is confidered, would, and ought justly to have its Weight: But when he thus, bona Fide, abandons his Water to all the Rigour of Chemical, or indeed any Research or Analysis; they must be in Love with Error, who refuse to be undeceived, in a Point so suf-

ceptible of Demonstration.

The Proprietor was at first so dissatisfied with the Tafte of the Water, that imagining it to be of no Use in its natural Condition, from its uncommon yellow Colour, and harsh, rough, adstringent Taste; he thought of Means to make it crystalline, foft, and palatable: So far was he from contriving to fophisticate it. with Allum, as is the vulgar Opinion, from its carrying to the Drinkers, a Taste somewhat like Allum; but which is indeed no other than a Taste compounded of Borax and Acid, and not Aluminous, as they commonly, and without knowing its true Nature, alledge. Likewife confider, that Borax, fold as it is at the Medium Price of eighteen Shillings a Pound, the legislib of viewend to and is

CHAP. V.

is rather too expensive an Ingredient to quit the Cost of adulterating the natural Water with.

Nay, the Proprietor had so little Notion of its real Worth, that in Order to soften the Water for common Drinking, and Use, he was so unadvised, as to throw into the Well a Load or two of Lime, which caused so great an Effervescence, and made such a Reeking and Smothering; that he was glad to clear it all out again, and on better Advice and Consideration, came to think it more valuable, with the Qualities it already had, than those he wished in it: and this is all he ever put into the Well; which tended more to his own Damage, than the Advancement of his Interest in it.

Tenthly, If this Water was the Produce of any artificial Preparation, it would infallibly be discovered by the Smell, when evaporated; or the Steam in the Operation would emit a Smell in the same Manner, as all Salts, Fosfils, or Minerals whatsoever, after they have undergone the least Motion, or Handling of the Artist, and are incorporated with an aqueous Compound: But as here are no such Symptoms, it is undoubtedly Natural, in all its Qualities. See Experiment XXXVII. This may be sufficient in Answer to all Suggestions or Imaginations of this Shadwell-Water being an artificial Composition.

Corollary the Fourth ...

That this Water contains an Acid; that the Mineral Contents are diffolved by the Acid, which

which however is not a fufficient Quantity to disfolve the Mineral Contents of this Water entirely; whence it retains its earthy yellow, or French Brandy Colour: Because stronger Acids assured, clarify it, as is proved from Experiment XVII, to XXVIII.

Corollary the Fifth.

That this Water is provided with all such Mineral Contents, as are requisite for a natural Hot-bath, but not having received a sufficient Acid to heat it, it springs or streams forth cold; that it is also enriched with Chalbeat Contents: Therefore, in the first Chapter, not improperly called a Hermaphrodite between Acidulæ and Thermæ; and that it also possesses such Spirits, as the natural hot Waters are destitute of; see Experiments XVII, XXI, XXII, XXIII, XXV, XXXIX, XL, and XLI.

Corollary the Sixth.

That this Water partakes of feveral Minerals or Fossils that are Medicinal, which are fo united and cohered with it, that other Minerals, whose Basis is Acid, cannot destroy the original Texture. See Experiments XVIII, XIX, and XXIV.

Corollary the Seventh.

That this Water contains an Antimony, to which we may very justly attribute its emetic and purging Quality; that its Salt is a Borax, and that it also partakes of the Phlogiston

Phlogiston. See Experiment XXXVIII, XL, and XLII.

But fince I more especially here aver, that Borax is the specific Salt of this Water; and that probably this is the only Medicinal Water-well in Europe, that contains this Salt, it may not be improper to touch transiently on the great Medicinal Virtue attributed to Sal-Borax: The Nature of which not being yet sufficiently known, is a Matter by most Writers still complained of, notwithstanding it is in great Repute in the Practice of Physic.

Dr. Van Swieten, in his excellent Commentary on Dr. Boerhaave's Aphorisms, Sect. 135, "fays that, Borax is commended much as a

"De-obstruent, and is used in the most ob-"stinate Diseases, as it acts partly by its won-

" derful Stimulus, and partly by its attenuant

" faline Power."

Dr. Newman, in his Prelectiones Chemicæ, Page 427, fays, that "Borax expels, opens," and discusses thick Humours; that it promotes and facilitates the Delivery of Women in Labour, the Secundine or Afterbirth, and the Menses, stimulates and promotes to Venery, in a Manner unhurtful and natural to the Constitution, and is a secundine for the Fluor albus." To which I may, of my own Knowledge and Experience add, that Borax is a sovereign Remedy in crazy Constitutions, and almost worn out; so as to revive and restore Nature, as much as possible in such Cases.

and Liver are affected.

The very ingenious and learned Mr. John Hill, in his last published General History of Fossils, Minerals, &c. has given (Page 395) the most accurate Account that I have seen, of the Origin, Product, and Nature of Borax, to which I refer the Judicious: And I doubt not but they will receive great Satisfaction, when they have examined and compared the Experiments on the Shadwell Waters, with Mr.

Hill's Description of Borax.

But it is greatly furprizing that all modern Writers confine Borax only to Afia, and many of them deny even the Probability of this Salt being found in Europe, or in any other Part of the World; whereby the Search after this valuable Fossil is hindered, or greatly discouraged; notwithstanding which, it is highly probable, that on proper Investigations our European Mountains would not be found destitute of it. Dr. Jorden (Page 44) in his Discourse of Natural Baths and Mineral Waters, positively affirms, that the Isle of Lambay, near Dublin in Ireland, produced a fixed Borax; and as this Author feems to have been a Gentleman of found Judgment, and one of the best skilled in the Mineral Kingdom, of the Age he lived in, one would not imagine,

imagine, that he could venture an Affertion of this Sort, of a Fact, which if false, could be so easily disproved; and if true, is it not a Pity that so beneficial a Discovery should have been lost for Want of Cultivation or Improvement?

Corollary the Eighth.

That this Water contains an Acid of Vitriol, which is by the Mineral Contents for much abforb'd, as not to occasion or promote any Effervescence with Alkali, and discovers itself only by Precipitation. See Experiments

XXXI, XXXII, and XXXIII.

The most eminent Gentlemen of the Faculty prescribe Spirit of Vitriol, as a Remedy in malignant Difeases; and indeed, Experience has approved it for a proper and ferviceable one, in certain peculiar Cases, where it has fignalized its Efficacy. But I cannot help observing here, that it happens frequently that these strong Acids, from various Reasons, come to be irritated in the Stomach; fo as to produce thereby most exquisite Pains, such as Flatulency, Spafms, iliac Paffions, &c. &c. * which are commonly but improperly called Convulsions of the Bowels: The cautious and judicious Physician therefore chuses to prescribe in Distempers that require Acids, fuch as are absorbed, and past an Effervescence, a Quality for which the most excellent and learned Dr. Stabl held the Tartarus Vi-

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^{*} See more at large Van Swieton's Commentary on Boerbauve, Sect. 63.

on the Shadwell CHAP. V. triolatus in high Esteem: Therefore, as the Acid of this Water is also past an Effervescence, it is the more safely to be recommended, and forms the higher Presumption of its sanative Virtues.

Corollary the Ninth.

That this Water contains not any Minerals that are heterogeneous to the human Constitution, is verified by the Experiments XXXIV, XXXV, and XXXVI. For was there any Copper dissolved or detained therein, these volatile Alkalis would precipitate it blue: Or were there any other Fossils in this Water, besides Antimony and Iron-Earth, that were precipitable; then these volatile Alkalis would not have agreed so exactly with the fixed ones, but would necessarily produce a Precipitation different in Colour from yellow, and a brownish yellow.

Corollary the Tenth.

That this Water readily and homogeneously unites with vegetable Salts, infomuch as to partake of their Nature, is evident from the Experiments XXIX and XXX; so that we may safely conclude, it mixes kindly with the Chyle, and in Course carries very powerfully its Efficacy into the Blood, so as thereby to be distributed through the whole Machine; to which very salutary Property, may be attributed the many Cures this Water has to boast of, on outward Ulcers and old Wounds; over which it has a singular Power.

Corollary

Corollary the Eleventh.

That this Water may be used, as a safe and efficacious Cleanser for the human Constitution; especially in those periodical Revolutions of Spring and Fall, when it is ever highly expedient, if for nothing more than Prevention, to discharge all undue peccant Juices, contracted in the Intervals, which our Bodies are so obnoxious to, when we are even in the best State of Health. See Experiment II. and III.

Corollary the Twelfth, and Last.

Upon the whole, we may with Certainty, and authoritatively pronounce, that this Water cannot be a Contrivance of Art, or occasioned by any Accident, of Situation of old Vitriol or Copperas Works, and as little by any Corruption of Sea-coals; but that it undoubtedly is a Natural Medicinal Water, produced of a Medium-Nature between the Acidulæ and Thermæ; but rather richer in the Mineral Ingredients, or Contents, than either the Acidula or Therma, according to the Experiments pre-deduced; whereby it is proved, to contain (1.) Iron-Earth. (2.) Antimony. (3.) A Phlogiston, or Principium inflammabile. (4.) Acid of Vitriol, that is absorbed. (5.) Sal-Borax. (6.) Mineral Spirits well digested and fixed. (7.) And common Water, with which all these Ingredients are con-corporated. And indeed, the Spirits of this Mineral Water are fo well fixed, and keep the

the whole Mixture fo unalterably together, that they enable it to stand Exportation to any Part of the World, without any material Diminution of its primitive Quality, Goodness, or Efficacy: So that it must be of signal Service, especially to our Colonies abroad, in the West-Indies or elsewhere, in such chronical or endemial Distempers, as those hot Climates are apt to create in European Constitutions, the Relicks of which Distempers, these Waters would be falutarily employed to rid the Body of.

Closing then here, on the Head of Experiments, and Corollaries thereon; in Order to verify and establish the Genuinness and Virtues of this admirable Water. But, as the fame is a modern Difcovery, and Examples persuade more than the strongest Reasons, and form a Bridge for others to venture over: I fubjoin here a few Cases, selected from a Number of Cures already performed by these Waters, in the very little Time that their Medicinal Use has been known or attend-

ed to.

In the Front then, of the Examples, I think I may justly place the Cure these Waters operated on a black Boy, belonging to his Grace the Duke of Cleveland; and by Permission of their Graces the Duke and Duchess, the Mention of it was inserted in Mr. Berry's printed Advertisements, in Order to spread the Fame of it to the Public.

This Boy was, it feems, afflicted with the Yaws, a Distemper happily unknown to these our Climates, being peculiar to that of the Negroes, or African Nations: But, as this Diftemper is of a putrid Nature, fo as to rot the human Flesh insensibly, and without the affected Part feeling any Pain, also without any Inflammation or Fever, preceding or accompanying it. From the History and Defcription of this Boy's Symptoms, I am apt to believe, that he was either actually afflicted with this dreadful Malady, or with one not inferior in Malignancy to the Yaws; for I am credibly informed, that all his Head was crusted over with large Scabs, his Shoulders and Neck interspersed with ugly hard Swellings, and other Parts of his Body broke out in putrid Ulcers. Such was his Condition, when their Graces of Cleveland, from their innate Tenderness and Humanity, suffered no Means to be spared, for the Recovery of this their Servant; for the Space of eight Months, he had the Advice and Affistance of many eminent Gentlemen of the Profession, in which Space, he was thrice falivated to no Purpose, or perceivable Melioration whatever: But, at length, he being fent by their Graces Order, to the Shadwell Spaw; the Under-steward of that noble Family, and a Surgeon, under whose Care he had been for fome Time, brought him thither, where he both drank and bathed every Day; first drinking a Pint of this Water in the Morning, upon an empty Stomach, and then, fome Hours after, he went into a prepared warm Bath of this Water, in which M 4

he remained an Hour and upwards. And with this Method alone, this black Servant became

cured in eighteen Days Time.

But, whether this black Boy brought this Diftemper from his native Country, or revived it here, by coming into another Diet, which feems not fo probable; or whether he might contract a Venereal Taint here, that would naturally revive his native Distemper the Yaws, the Seeds of which might yet be lurking in his Blood; are all Circumstances which I am not able to determine: For we have Instances, that the European Air and Diet alone have cured this horrid Distemper; but whatever might be the Caufes, this Boy was certainly most radically and inveterately afflicted; fince three fucceffive Salivations were not able to correct, or overpower the stubborn Infection, which yet submitted to the Efficacy of these Waters, in no considerable Space of Time.

In Cases of Leprofy this Water has also signalized its Efficacy, but the most authentic and remarkable One, I take to be that of William Wheatly, an Apprentice to Thomas Price, a Joiner in Seacoal-Lane, near Fleet-Ditch, who, for six Years was most malignantly, and miserably afflicted with this dismal Distemper, for which he was by Sir Hans Sloane advised to drink this Water three Times a Day, and bathe in a warm Bath, prepared of the same; and I am informed, that in the Time he made Use of it in this Manner, he shewed himself once a Week be-

fore the College of Phyficians, and is now perfectly cured by this Course of Drinking

and Bathing.

There are other Inftances of Cures performed by this Water in leprous Cases, for which I refer the Curious to an authentic Account of them, preserved by the Proprietor, as far as needful, to support and attest the

Truth, and the Truth only.

In fuch Ulcers, or Wounds, as have infected the Tendons or Nerves, either by immediate Excoriations, or by drawing the Nutriment from them, and thereby enfeebling and weakening the same, so that they are no longer able to execute their common Offices, or to discharge their natural Function, in imparting Strength to the Members of the Body, this Water is a fovereign Remedy; and indeed, it has distinguished itself surprizingly in many Instances of this Nature; but more particularly in the Case of one John Gosden, at the Angel and Crown, in Hungerford-market, who was for fix or feven Years most miferably afflicted with fore or ulcerated Legs, in which were broke out Seven very grievous Ulcers; infomuch, that he was obliged to make Use of Crutches: Whereas he is now perfectly restored to the Use of his Legs, and the Ulcers are cicatrized and healed up by only the Application of this Shadwell Spaw.

In the Case of weak and lax Fibres, the Foundation of so many fatal Disorders, and itself a very bad one, this Water works admirable Effects. In Attestation of which, the

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Case of Mr. Francis Dutton, in Rosemary-Lane, over against Mr. Cross's Brewhouse, deferves to be quoted, whose whole sibrous System, was in so lax and enseebled a State, that having no Use of his Limbs, he was obliged to keep his Bed for a Twelve-month, but by the Use of this Water only, he is restored to the full and perfect Use of his Limbs.

I should too much depart from my Purpose, were I to enumerate here, the many authentic Cases of the different Distempers, such as Dropfies, Fiftulas, Confumptions, &c. that have been relieved or cured by the Use of the Shadwell Spaw Water. Praises that attempt to prove too much, prove nothing; but it is to the judicious Physician I appeal, Whether it is at all improbable, that this Water should prove fo valuable a Difcovery, as to me it fully appears; and so extensive a Remedy for many Diforders, that affect the human Constitution; when it answers so many Tests, as manifest it an aquatic Concrete of such say lutary Ingredients, that go as near as any I know in the whole Medicinal-Water Genus, to form a Panacea: fince Trials of Art and Experience, have already shewn it to be an excellent and safe Evacuant, as an Emetic; a purgative and gentle Diuretic, a certain Cleanfer of the Blood, a generous Diffolver of all calculous earthy Matter, that can possibly affect the nervous System; an absolute Strengthener, Bracer, and Reviver of weak and lax Fibres, and a most powerful consolidant of all inward, and outward Ulcers, Wounds.

Wounds, Scabs, or Tetters, whether green or old.

As to the Use of this Water, I am forry that I cannot here fet down or specify the Methods, which each Patient followed in the above related Cases: Because, as the Discovery and Use of it were in their Infancy, it is eafy to be imagined, that no regular Form or Order were observed by them, whilst the Rationale of this Water's Virtues was unknown, and could only be tried on the Faith of an empiric Prescription in their several Cases, The Patients, it feems, began to drink and continue it, without any Regard to Exactness in the Dose, till it vomited, or purged them; in bathing likewise, they proceeded in the fame irregular, defultery Way; fome did not even bathe at all, but applied the Water crude, or warm, to the affected Parts, and yet for all this loofe, unguarded want of Rule and Regimen, these Waters did not miss of performing these surprizing Cures: They must however certainly work more steadily and efficaciously, when subjected to Rules and Orders, in their Use and Applications, subordinate however to necessary Variations in particular Cases.

But for a general Direction, and Rule, I take a Pint to be a fufficient Dose, taken in the Morning upon an empty Stomach: Which Pint too, I apprehend to be best taken in four Doses, or Glasses, walking, or using any gentle Exercise about Half an Hour between each Glass, and when the vomiting is over, to take

either

on the Shadwell CHAP. V. either a Dish of Coffee, thin Gruel, thin Chocolate, or very weak Broth, of which the Fat should be clean skimmed off, and without Spice, or Herbs, after which Breakfast as ufual.

As to Bathing, I think those that drink the Waters in the Morning, should bathe in the Evening about Six o'Clock, before Supper: But if they have a Mind to bathe in the Morning, I apprehend that, in such a Case, they should not drink the Waters at the same Time, but forbear their inward Use, when the external is thus applied: but this Caution need not extend to those, who only bathe partially, or soment particular Parts, but not their whole Body. These may at the same Time drink the Water also.

With Respect to Diet, or the Regimen of Eating or Drinking, whilst under a Course of these Waters, I do not conceive there is any Necessity of being so scrupulous or exact, as is requisite in a Course of Chalybeat Waters: but, however, those will sooner reap Benefit from these Waters, who confine themselves to some Rules, and adhere to such Food, as is proper in their respective Disorders: But there is no Manner of Necessity or Occasion for Aids or Correctives, to be taken with Shadwell Spaw, such as Coriander-Seeds, and the like comfortable Aromatics, or bitter Salts, that are absolutely requisite with the Chalybeat Waters.

This may be fufficient for a general Hint of Directions, for the Use of this Water, in

some Method or Order; nor can a more particular, or special Regulation be expected, unless some Gentleman of the Faculty, should attend this Medicinal Fountain for a Space of Time, that their Use might be entirely under his Inspection; when I doubt not, but from his minute Observations, more authentic Directions might be framed: And fo far is certain, that a Water of fuch fingular Properties, and Virtues, well deserves such a Super-intendance, and the sooner it takes Place the better; with which Wish I conclude this Chapter, taking my Leave of the English Mineral Waters, and proceed to those of Cleves, in Germany.

CHAP. VI.

Containing a Geographical Description of the Town of CLEVES, and its Neighbourhood: Also a Physical Account of the famous Spring of Chalybeat Water there; with the pleasant and commodious Situation, for the using of the said Medicinal Water.

DEFORE I proceed any further, I think it will be necessary to give a short historical Account of the City of CLEVES, and its Neighbourhood, wherein Providence hath bleffed

bleffed us with that excellent Chalybeat Waster, which is one of the principal Topics in this Work; and then we shall compare the same with the Town of Spaa, whereby the great Superiority which CLEVES may claim

in this Respect, will easily appear.

The Town or City of Cleves, from whence the whole Dukedom takes its Name, was anciently the Residence of the Dukes of Cleves: but fince this Dukedom, with feveral other Dominions in Westphalia, have been inherited by the most illustrious House of Brandenburgh; there is a Chancery, with feveral other Courts of Justice kept there, for this Dukedom, and the Countries in Westphalia, thereto belonging. It is a regular, well-built City; populous, and endowed with all Manner of Delicacies, that human Life can defire. The Inhabitants are very courteous to Strangers, and all Religions are here tolerated. The Roman Catholics have feveral Churches and Monasteries; the Lutherans one, and the Presbyterians have one; the Yews, the Anabaptists, and other Dissenters have also their Meetings.

It has been advanced by Mr. de Vries, and feveral other Writers, that Cleves may be compared with Jerufalem: Because the one as well as the other was built upon three Mountains. The Mount of Olives near Jerusalem, is supplied at Cleves by that pleasant Hill near the Royal Park, called the Mountain of Cleves, whereof more hereafter; and the River Kidron, is at Cleves resembled by

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the River Kermeldahl: And thus much may

fuffice here of this Comparison.

The Town of Cleves lies under the temperate Zone, in fifty-two Degrees, and fome Minutes of Northern Latitude.— It is eight Leagues distant from the strong Fortress of Wesel; two Leagues from Emmeric; four Leagues from Nimeguen, a large trading City in that Part of Gelderland, which belongs to the United Provinces; and fix Leagues from Arnheim, another very confiderable Town in this Province.

The Situation of Cleves is extremely agreeable and healthful: Towards the East, about two Leagues distant, slows that most noble River the Rhine. The Ground extends in a fair and fruitful Level, disposed into ploughed Lands, for the Productions that are ferviceable to Men, and Pasturage for Beasts. The South and West Parts of the Town diversify our Prospect with a rising Ground; here we have aspiring Mountains, Flowery Gardens, shady Groves and Forests, extensive Meadows, Heaths and Lawns, which are perfectly commodious for Hunting; fo that, if their Constitutions will permit, those who visit these Chalybeat Waters, have here the most inviting Opportunity to exercife and entertain themselves with this noble Diversion. To the North of Cleves, is that most magnificent Royal Park, with its Mountains before-mentioned, in which Doctor Shutte has discovered this excellent Chalybeat Water; and, by this Means, has enriched us with a Variety in the

the Bounties of Nature, by adding a wholefome Medicine to the Pleasures, that abound in this Place.

Cleves is bleffed with an exceeding healthy Air; because the upper Part of the Town being built upon a dry mountainous Soil, the Air that is fanned through the Forest is, as it were, refined thereby, and that which comes from the Mountains over the Town, carries all Vapours and Exhalations into the Flats: And there they are received into the Rhine and the Waael, and fwept away by the Current of these Rivers, which, at the fame Time, by their Motions, occasion a healthy Change in the Atmosphere. Nor are there any standing Waters, or Morasses near, or about Cleves, that, with their frequent Stagnations and Putrefactions, are able to infect the Air; but all is carried off into the main Ocean.

The Royal Palace, which was anciently the Ducal Residence in this City, is very samous for its Antiquity, sine Structure, Spaciousness, and its most charming and delightful Prospects upon the Rhine, and the Cities of Calcar, Rees, Emmeric, Griethuyssen, Eltenberg, Schenkenshans, and several other Places. This Palace is at present inhabited by the Lord Chancellor, the President of the Royal Chamber, and other inferior Officers in the Chancery. These Gentlemen are extraordinary civil and obliging to Strangers, but none more eminently so than the Lord Raesfeld, who is the Lord High Chancellor himself; and

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the Vice-Chancellor, Von Koenen. The Chancery, the Royal Chamber of the Finances, and the High Court of Justice, with all their Offices and Repositories of all their Records, are kept in this Palace. It is said, but with what Authority, I pretend not to determine, that Part of this Palace, an old square Tower, and a large Hall, which goes by the Name of the Long-Hall, were caused to be built by Julius Casar, in the Year 698 from the Building of Rome: And Mr. Teschenmacker endeavours to prove it by an Infecription that formerly was found in this Hall, which is as follows:

Anno ab Urbe DCXCVIII.
C. Julius Dictator,
Hisce Partibus Subactis,
Arcem Clivensem
Fundavit.

But the Inscription, that is at present to be seen there, seems to be of a newer Stamp, and is written in this Manner:

Anno. Ab. Urbe. Romana
Condita. Sexcentesimo.
Nonagesimo. Octavo.
Julius Cæsar Dictator.
Hisce Partibus in Deditionem.
Subactis. Arcem Clivensem
Ædificavit.

Upon this Long-Hall above-mentioned, there is erected the Statue of Eumenius the Rhetorician, carved in Stone, after the ancient N Manner:

Manner: This Eumenius was the first Rector at Cleves; and about fifteen Years ago, when the Middle-gate of this City was beautified, a Resemblance of that Statue was painted over the Front of this Gate, with a large In-

scription concerning him.

The City of Cleves is of great Antiquity. It was first founded by a Roman Colony, which was encamped about a thousand Yards from the present City, on the very Spot, where, at this Time, the Village Kellen is to be feen, and the Harenacium was erected: where at prefent the Village Qualburg stands. which is but a very little Way from Cleves. This Town, after its Foundation, foon floutished and grew very populous, but was entirely destroyed in the Dioclesian Wars: But, as Tranquillity revived, the present Cleves was re-built out of its former Ruins, and never after suffered such an entire Destruction, but rather continued advancing in Profperity, tho' at fome Times but flowly, and as Fruits are retarded in their Maturity by a backward or unkindly Season. But, fince it has been under the Influence of the most illustrious House of Brandenburg, it has, by the Favour of its cherishing Beams, shot forth in great Abundance, with Elegance and Improvement, both in Respect to Art and Nature, as well in the most magnificent Buildings, as beautiful Gardens, Groves, Walks, &c.

When you pass out of the Nassau Gate, which is so called after Prince Maurice of Nassau; you are in a most stately shady Walk

of Lime-Trees, in the midst of the finest Pleafure-Gardens, upon a Mountain, which, still as you move on, refreshes the Appetite of feeing with new and uncloying Feafts of Variety. These Gardens belong to the Nobility of Cleves, but they are devoted to the Reception and Welcome, as well as the Accommodation and Entertainment of all polite Strangers. The eminent Situation of these Gardens yields also a farther amusing Prospect, where with another adjoining Hill, they make a natural Amphitheatre in the Form of an Half-Moon, or look as if Nature was extending her hospitable Arms to embrace each approaching Visitor. The Avenue or Visto before the Nassau Gate is above two-thousand fix-hundred Yards long, planted all along with Lime-Trees, in the greatest Order and Perfection, as is already mentioned. In the middle, between, and under the verdant Canopy of their Shade, is the Road for Coaches, and on both Sides are the Paths or Walks for Foot-Passengers: This is called by the French the Allee Royal.

Since I have mentioned the Vistoes, wherewith the Neighbourhood of Cleves abounds; I think it will not be unnecessary to give some farther Account of them: But they are so numerous, and beautifully diversified, that I cannot have Room to give a Description of them all in this Place. One of these Vistoes extends itself no less than five Leagues, from Cleves to Xanten, planted all along with Oak, Beech, Fir, and others of the tallest and

most spreading Timber Trees, growing very regular, shady, and cooling in the Summer. This noble Plantation was performed at the Command of that illustrious Monarch, Frederic the First, King of Prussia. Those Vistoes, that extend from the Haagsbegate to Cranenburg, are two Leagues long, of fair Lime and Beech-Trees: And from this same Gate to Matterborn, Gog, Gennep, and to several other Places some Leagues distant also, of Lime and Beech-Trees; besides the many cross and By-Roads, all adorned with regular Rows of the sinest Trees in the most delightful and commodious Manner.

Matterborn is about two English Miles distant from Cleves; and here are several pleafant and elegant Country-Seats, or Villa's, for the Nobility of Cleves, where Strangers are often very politely entertained. At Berg-endabl, about three English Miles from Cleves. where Prince Maurice of Nassau resided in Summer, when Governor of that Dukedom, there are very stately Viscoes of Fir-Trees: and near this Place, at the Village of Qualburg, there are tempting Vistoes of Fruit-Trees, continued to a great Extent, and planted in curious Order. From the Caverinshe Gate to the Royal Park, forming an excellent Visto of Lime-Trees, and on both Sides the various Scenes of fruitful Gardens, and rich Pasture-Lands: With many other fuch stately Walks and shady Groves, fragrant and fruitful Gardens, these Parts are so richly bedecked, and, as it were, embroidered over, that

that they must be here omitted; because it would be an Injury to their Beauties and Perfections, to mention them superficially; and to make a Representation of them proportionable to their due Merits, would require a Volume only on that Subject. We are indebted for most of the before-mentioned Beauties, to that indefatigable and most excel-

lent Prince, Maurice of Nassau.

The highest Mountain near Cleve is called the Mountain of Cleve: It lies about an English Mile distant from the Town, and is wonderfully pleafant. It is reported, that this Mountain is of equal Height with the Swan upon the Spire of that exceeding high Tower on the Royal Palace, which is called the Swan's-Tower, and stands also upon a very high Mountain. King Frederic the First was, with extraordinary Expence, the Beautifier of the Mountain of Cleve; for he not only caused the same to be made in such Manner, that Chariots and Coaches may drive almost to the Top of the Hill, but he also raised it higher, in Order to command a more extenfive Prospect over the Forest, the adjoining Hills, and the Royal Park; and the Brows of it are crowned with a noble Garland of lofty Lime-Trees, which are furrounded with Benches, to rest those who have wearied their Limbs in ascending to them: And then they are tempted by Stair-Cases about their Trunks, to afcend still higher into their shady Arms and Heads, where they may weary also their Eyes, with the Variety of distant Objects

Objects around them: For from hence is their Sight directed down eleven Vistoes or Avenues, leading to the Foot of the Mountain into the high Roads; and such spacious Avenues they are, that Foot-Passengers, Horsemen, and Chariots may pass and repass without Interruption. These Avenues also direct to so many different Places, which are to be seen from the Top of this Mountain; so that, from this one Spot of Ground, you are instantly entertained with eleven different

and agreeable Prospects.

There is another Hill, called, in the German Language, Frendenberg; in English, The Rejoicing Mountain, about two English Miles distant from this Town. From this Hill. the City of Cleves represents itself in a most beautiful View, intermingled with Gardens and Orchards of the finest Fruit-Trees, Meadows, Woods, Walks and Waters, in Ponds, Rivulets, and other Varieties. There is also an exceeding fine Prospect to be commanded from this Mountain, all along the Champain or Flat Country, and the River Rbine. Alfo, contiguous to this Mountain, there is another alike famous for pleafant Prospects, adorned with afpiring Fir-Trees. So that the Curious may have their Choice, not only of what Prospects will best amuse and delight them, but also of what Shades they would behold them from, or contemplate and folace themselves under; whether of Oak, Beech, Lime, Fir, Pine, Fruit-Trees, or many others: And, as under some that are green

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all the Year, fo consequently those that yield their cooling and comfortable Shadow or

Shelter all Hours of the Day.

If the English Gentry, who have so much encouraged their Evening Entertainments by Lamp-Lights, in some of the public Gardens near London, had one of these Mountains so planted there, to illuminate in the same Manner, and harmonize with an Orchestra in the Trees and Arbours at Top; or would contribute as much to raise such an one, as they have to support these Places; it would exceed, beyond all Comparison, Vaux-ball, Ranelagh, Cuper's Gardens, or Marybon; and might be a vast Improvement of those Asfemblies Al Fresco; by not only making such a lofty and circular Body of Illumination shine more conspicuously and invitingly over all that great Metropolis, and feveral of the adjacent Towns and Villages; but fave a prodigious Expence in Candle-Lights and Faggoting on Rejoicing Nights, by being made the Bonfire or Luminary-General upon those Occasions: And then London would have its Mount Brilliant, as well as Hanover, and its Frendenberg or Rejoicing Mountain as well as Cleves. I know not how these worthy good Citizens may approve of my Project; but they may plainly see, that I have studied not only for their Diversion, but their Interest as well as their Health.

Now I will give a little imperfect Landskip or Sketch of the Royal Park, in which my intimate Friend Dr. Schutte has discovered N 4 that

Water. Imperfect I must call my Description, as the Grandeur of this Park exceeds so much any Thing of that Nature I have ever seen, that I hardly can draw the Outlines of this worldly or temporal Paradise. However, I will offer an humble Essay, that, if any of my Readers shall hereafter see the Place itself, they may be so much the more delighted with new Beauties of their own Discovery, whereof they had not been before

apprised.

The pleasant Road out of the Caverinthgate, on the North-fide of Cleves, leads into this Royal Park, which is about one English Mile distant from Cleves. This Park is about two Leagues in Circumference, has four large Porches or Entrances, and the high Road extends throughout, without any Obstruction for Coaches, Chariots, and Horsemen; but no Hounds, or Dogs of any Kind, are admitted. This Park is plentifully stocked with the most beautiful Bucks, Does, &c. of the finest Breed, which in the Summer have saperfluous Pasture to graze on, infomuch that the Grass, which is to spare, is made into Hay for their Winter's Food. At the Entrance from Cleves into the Park, there is a large well-built Manfion-House, the Habitation of his Majesty's Deputy-Ranger of this Park, and the Forests in the Dukedom of Cleves, who is a very complaifant and entertaining Gentleman to all civilized Strangers.

From this House we proceed some hundred Yards forward, and then arrive at the Water-works, where we meet with four very good ones, that play up their Streams to a confiderable Heighth, with two Cascades and Grottoes. Above these Water-works, towards the Mountain, is the Amphitheatre in a Half-moon Figure, which was erected in the Year 1711, and the Year preceding, by the Order of Frederic the First, King of Prussia. This Amphitheatre has a Cupulo in the Middle, and, on both Sides, fourteen Arches, in all Twenty-eight, which are fo spacious, that two Ladies together may at once, with their largest Hoop-petticoats, walk under them. From this Walk the Spectators Eyes are courted by many rich and variegated Prospects all over the Water-works, Statues, Vistoes, and Avenues; besides several Cities, Villages, Pasture Lands, Forest and Rivers, even to a Sight of the Navigation on the Rhine.

Near this Amphitheatre, the Chalybeat, or Mineral Water Well is most commodiously situated; so that in Case the Air is most or wet, the Gentry walk under those pleasant and sociable Arches, when they assemble to drink the Waters, without the least Fear of being incommoded by an Inclemency of the Atmosphere; and this is such an exceeding great Convenience to the Water-drinkers, that I dare say it is hardly to be matched in Point of Accommodation, by any other Mineral Well in Europe.

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These Water-works are adorned with many fine Statues and Images, very well executed in polished Marble; and there are two Lions carved in the same Material, of very curious Workmanship; one holding in his Paws the Coat of Arms of the States-General, and the other the City Arms of Amsterdam. Both these Lions were presented to ornament these Waters, by the City of Amsterdam; the Gentry of Holland using, for some Years past, to resort to Cleves for the Summer Diversion.

From the Amphitheatre on the Right-Hand at a small Distance, was formerly the Lodge where the Master of the Water-work refided, or fuch Person as was appointed to supervise and keep the same in good Order; but, fince the Discovery of this Chalybeat, his Habitation is by his Prussian Majesty's Command removed, the old House being pulled down, and a spacious Tavern, with large Rooms built on the Place. Before this Tavern, there is a large Fish-wear, or Confervatory, in a long square Form, and there is in the Middle of it another Water-work, in which it is artificially contrived, that by the Motion of the Water feveral Figures are agitated to Dancing and other Exercises, agreeable to the Characters of what they represent; which makes this Tavern extremely delightful to many People; not to mention the feveral pretty Boxes, Lodges, Summer-Houses, &c. pleasantly situated on the Banks of this Water, for the Reception and Entertainment

of Company, out of all which Rooms there

are very beautiful Prospects.

From the Left of the Amphitheatre, paffing near the Ice-Cellar, we come to the Star-Mountain, and may afcend to the Top of this through a commodious Road, over-shadowed all the Way up, with very flourishing Oak and Beech-Trees, and upon the Summit or Pinnacle of this Mountain there grows a Lime-Tree, that looks more graceful and majestical than the tall spreading Plumage, that rears out of the Crest or Burganet of an armed Hero. From hence we are directed. by twelve Viftoes or Alleys, to many fair and variegated Prospects. These Alleys shoot their Rays out into the Form of a double Star, whence the Mountain received its Name from Prince Maurice, by whose Directions it was disposed into this Order. There are several other Mountains in this Park, all trimmed and adorned with the like Sylvan Furniture of Woods and Walks, Arbours and Areades, Glades and Avenues, Viftoes, and new Prospects of fresh Entertainment and Variety; but the Limits proposed to this Treatise, will not permit me to give a Description of them.

The Remainder of this Park below the Water-works, the Spaw, and those Mountains to the North-East, is beset with a Diversity of pretty Groops and Groves, shady Walks and Alleys, of Oak, Beech, Lime, &c. sometimes opening and extending by fresh Vistoes, into new Views and Prospects; and sometimes turning or winding, as it were, into

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endless Labyrinths of the verdant Scenery, and other delightful Objects; your Steps are attended all the Way by the clear Streams or Rivulets that are gliding beside your Paths along the Ground, and over Head, you are so spaciously canopied, as if the Trees stretched up their Arms to contribute such a continued Umbrella as might shelter you, whether walking or riding, from the Inconveniences of the Sun or Rain.

His Majesty's Palace in this Park, where Frederic the First, King of Prussia, very often resided, and the other Summer Seats or Residences belonging to the Nobility, adjoining to this Park, I must omit for the Reasons already mentioned. In short, if any of my Readers should repair to the Spot, they will find it to be true; that in this Park Medicine has taken up her Dwelling with Pleasure, and that Nature in her Beauty and Art in its Perfection, are united in the most consummate Manner; that no Spaw can boast of such a Terressial Paradise, not even the warm Baths in what Country soever; and that it is second only to the Paradise, which was in Eden.

It is another Convenience, that this Spaw is so near the beautiful Town of Cleves, where the Gentry and Visitors may be accommodated to their Wishes, and the Way from the Town to the Park is so pleasant, that it is a singular Delight, either to walk or ride thither. Mr. Kayser, an ingenious Poet, informs us, that Cleves is adorned with, and renowned for ten curious Places and Rarities, that

are most delightful and memorable to the Beholder. Nor do they posses themselves of his Sight, but to his greatest Entertainment and Admiration; where he gives us the following Description of this City and its Neighbourhood, in his Parnassus, Pag. 119.—Decem Loca jucundissima curioso Memorabilium Spectatori, non sine ingenti Recreatione et Admiratione, oculis usurpanda præbet Clivia Nostra:

1. Arcem, 2. Arbusta, 3. Hortos, 4. Tiliam, 5. Vivaria, 6. Fontem,

7. Stellatos Montes, 8. Clivos, et 9. Gaudia, 10. Pontem.

To which Dr. Schüte has added Monumenta Principum, whereby we are to understand: 1. Arcem, the Royal Palace; 2. Arbusta, the Plantations, Walks, Vistoes, Alleys, &c. 3. Hortos, the many fine Gardens; 4. Tiliam, an exquisite fine Lime-Tree, that formerly grew before the Haagistgate, but some Years ago decayed, in the Place of which there is planted another; and Endeavours are used to affift Nature, that it may emulate its Predeceffor in Beauty and Magnificence, and it is in a fair Way; 5. Vivaria, the beautiful Royal Park, of which I have attempted a flight Description, and wherein Providence has bleffed us with that most useful Spaw or Mineral Water; 6. Fontem, the Water-works in this Park; 7. Stellatos Montes, the Star-Mountain, in this Park; 8. Clivos, that pleafant Place called Bergenthall, which fignifies,

in the English Tongue, a Mountain and Valley; 9. Gaudia, which is the Frendenberg, or the Rejoicing Mountain; 10. Pontem, the Stone Bridge cross the River; and lastly, the Eleventh, Dr. Schutte's Monumenta Principum, are the Tombs of the ancient Dukes of Cleves in the Cathedral Church, which are reckoned exquisite Workmanship.

Here I will stop in my Account of the Beauties and good Qualites of Cleves, which are absolutely tending to render the Use of its Medicinal Waters more agreeable and efficacious, more convenient and serviceable to those who drink them, than most Places I know of; and, after having thus displayed these Advantages, discover something of the Disadvantages which the little Town of Spaa, in this Respect of Medicinal Conveniences, is attended with, and so submit the Comparison to the impartial Judgment of the Public.

First, We must consider the Roads to Cleves and Spaa, which is a capital Article, as it is supposed Persons of sick and weak Constitutions are the chief Travellers, whom we are principally to be concerned for: And therefore it would be a barbarous Negligence to omit so material a Point. From the Sea-Shore to the former of these Places, through any Part of the United Provinces, there is the most easy Passage, either by Water or Land, that the weakest Constitutions can possibly expect or desire, and a plentiful Supply of all Manner of Conveniences, that they can require.

quire. On the contrary, the Roads from Aixla-Chapelle, and through the Principality of Liege to Spaa, are so rough, hobbling, and incommodious, that it is impossible for feeble Travellers to go through the Fatigue of the Journey: Infomuch that there are many Instances of Patients dying often upon the Road to Spaa, which is many Times reasonably attributed more to the intolerable Uneafiness they endured by the bad Roads in their Way thither, than to the Distempers they expected to be cured of. And as it is chiefly upon Account of the Geronster Water, which cannot be exported, but must be used at the Spring-Head, that the Sick or Diseased go to the Spaa; I will therefore plainly prove, in the Eighth Chapter, of the Experiments on the Chalybeat Waters of Cleves, that this is far superior to the Geronster at Spaa. And as the Poubon Water from the same Place, very well known in this Kingdom, may be with equal Efficacy administered at Home, without any Necessity, for the Use of it, to harrass the Patient with fuch a difagreeable Journey to the Fountain-Head: Because it endures, like the Pyrmont Chalybeat, Exportation. I think it therefore but reasonable, to consider this especially, among the Circumstances whereby the Patient may be endangered: And as the Remedies, which have hitherto been fo much travelled to Spaa for, may be more efficaciously supplied, with greater Convenience, with less Danger, and by a shorter and far better Way, at Cleves: What Occasion is there for

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for risquing our Bones and Lives in those horrid and dangerous Expeditions to Spaa?

Secondly, It is highly material, to confider the Air of the Place in which we intend to drink the Chalybeat Waters, which is at Cleves extremely ferene, calm, regular, and bealthy; as may be easily apprehended from the Obfervations I have already made; all Exhalations, Damps, Vapours or Mists, being, as before observed, carried off. It is also sufficiently warm, and favourable for the Digestion or Working of those Waters without being immoderately fo, to incommode in any wife the Drinkers of it at the Place; and this kindly or temperate Warmth it retains so much the longer, and with fuch an happier and wholefomer Equality in its Degree, as they are all Sand-Hills wherewith it is furrounded: fo that your Constitution is not put to the Hazard of any Extremes, it is under no Apprehension of enduring a sudden Cold upon the Decrease of hot Weather: But every Change advances without Surprize fo gradually, as to be almost infensible, nay, and even defireable to you. But at Spaa it is otherwife; this little Town lies in the Cellar of a deep Valley, all cooped and furrounded with fuch very high, steep, craggy, and barren Rocks, as are not only most horrid to the Sight, but make fuch strong and violent Reflection of the Sun Beams upon the Town: that it is all the Summer intolerably hot in the Day-time, and the Evenings and Nights as difagreeably cold; not only in being first obstructed

obstructed by those Rocks from the Rays of the declining Sun, but afterwards annoyed by the unwholesome Breath of Damps and Fogs it has exhaled out of their Bowels; fo that there are here Extremes upon Extremes, but in nothing more fo, than in its Thunders and Lightnings, which are both very frequent and very horrible: For, when the dreadful Roaring and Rattling thereof is heightened and rebounded from Side to Side of those repercuffive and echoing Rocks, it is so frightful or terrifying to many of the poor Patients, whose Minds are already dispirited by the Disorders of their Bodies; as not only to have given them greater Diseases, than any they brought thither, but made them quite incurable: Being possessed with a Belief of the Neceffity they were under to refign their Lives, fince it could be nothing shorter they were arrived at, than the Day of Judgment. But as this Situation of Spaa cannot affift the Air in carrying off the noxious Vapours and confined Exhalations, as that of Cleves does; I am furprized that People, after any Sight and Experience of the Place, can endure to abide there, at least as it is found so inconvenient and detrimental to the afflicted Sick; but that indeed as they came a long and tiresome Way for Relief, it would often be their Death to take fuch a fearful and fatiguing Journey back again; and fo they think it easier to leave their Bones there. Surely the Amusements of Spaa ought to be very extraordinary, to make 0

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Atonement for these, not to mention others

of its extraordinary Disadvantages.

Thirdly, We are never troubled at Cleves with too much Water; for, when it rains as hard or violently as it can, it only washes and cleanses the Streets, and runs constantly away through the fmall Channels, that are behind the Streets, into the River; fo that it is not in the least incommodious or obstructive: But at Spaa it is otherwise; the little Stream or Current, that runs through it. fwells frequently, after any fudden Rains, fo high, as to overflow its Boundaries, in fuch Manner, that it keeps the Inhabitants Prisoners in their Houses, and unable to stir an Inch abroad. How detrimental this is to those, who repair thither, for the Benefit of the Waters, requires no further Explanation; as it is well known to every Body, who is acquainted with the Chalybeats, that, with the Use of them, there is absolutely required Exercise.

Fourthly, The more convenient, pleafant, and inticing the Walks for this Exercife are, the greater Benefit the Water-Drinkers receive; for it is not only reasonable to suppose, but absolutely necessary, that the more the Mind in this Respect is entertained, exercised, and attracted from one Variety to another, the more successfully the Chalybeats operate upon the Body. That Cleves in this Particular may justly claim a great Superiority, is already sufficiently demonstrated; but what great Disadvantages there are, in this Point,

Point, at Spaa, is no less known by those who have been there: Because there is but one Garden, which can accommodate the Company with fuch Exercise of Walking, in all Spaa; and that is not only very small, but also only at some certain Times of the Day accessible, or fit for Use. This Garden belongs to the Capuchin Friars, and these Fathers expect at every Seafon at least a Couple of Ducats of each Person, who makes Use of them. And, besides this single Garden, there is not one Walk more, in all Spaa, any Ways convenient for the Purpose, except two fmall Meadows; whereof the one is called, The four Hours Meadow; and the other, The seven Hours Meadow: The Reason of which Denominations is, That, at Four of the Clock in the Afternoon, the adjoining high Rock projects its Shadow over the former, and at Seven o' Clock, in like Manner, over the last of them. But when it rains, the Water-Drinkers must stay at Home; whereas at Cleves, they may take the necesfary Exercise in that most delightful Gallery of the Amphitheatre, without any Interruption of the Weather.

Fifthly, There is a stronger and more violent Exercise than Walking in Gardens, necessary to be used with the Chalybeat Waters, by those Gentlemen, who, from thirty to sifty Years of Age, have been used to vigorous and violent Exercises, and complain of Rheumatic Pains, or are afflicted with Obstructions in the Joints, or other extended

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Parts of the Animal Fabric: In those Cases. I have never feen the Chalybeat Waters used without Success; provided the Exercise was adapted accordingly, to promote and procure the same. There is nothing better both to entertain and exercise the Mind and Body, than Hunting; and those Water-Drinkers. who have Occasion for this Exercise, have the finest Conveniencies and Invitations thereunto at Cleves, that are in all Germany; no other Situation being more favourably or delightfully disposed for the same, than the Neighbourhood of that Country. The very identical Spot of Ground is near Cleves, where the Emperor Charlemain used to divert himfelf with Hunting; and this was his most favourite Stage for that Recreation, in all his German and French Empire: But, where can this be enjoyed at Spaa, upon the rugged Rocks? In short, Sportsmen must absolutely leave their favourite Exercise at Home, when they go to Spaa for the Waters; but at Cleves they may be gratified both with this Pastime for their Diversion, and an excellent Chalybeat for their Health.

Sixthly, It is allowed, that Flies, Gnats, and other Infects of the fame Nature, are chiefly generated and occasioned, or nourished and increased by stagnated Air; but at Cleves, the Air, or Atmosphere, as above-mentioned, is rarissed to the utmost Perfection; so that we are not in any Degree molested with those pestilent and eternal Tormenters, as they are at Spaa. For there they have two Sorts of Insects,

Infects, that are always extremely troublefome: One rules the Night, and the other the Day-time. Those that have the Day's Work, are very large, and so industrious and greedy, in biting and fucking, at your Legs in particular, that both Sexes are obliged to be armed in a Kind of Gambadoes, or booted up in leathern Stockings: But for those more hungry Infects, that prey upon you by Night, as bad, or worse than the Muskettoes in the Indies, they have discovered no Remedy; infomuch that, besides being harrassed with the tedious Fatigue of fleepless Nights, you must continually undergo the Discipline of those vexatious Disturbers that occasion them. This is a fufficient Indication of the Unhealthiness at Spaa, that this Abundance of those Insects is fo confiderably owing to the stagnated Air of that Place; and how can it be otherwise expected, from what has been faid thereof? Which makes it plain, that it is a Place very unfit for the fick and afflicted Water-Drinkers to recover their Health, at least such a one as renders it probable, that you may fooner contract worse Disorders by the Air, than are cured by the Water.

Seventhly, There are other most requisite and material Circumstances, for aiding and affishing the kindly Operation of Mineral Waters, in removing most chronical Distempers, to entertain the Mind, and expel the sluggish, gloomy, and melancholy Humour, to which these Patients are so liable; and, for this very Reason, there is such a Variety of

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Entertainments invented at fuch Places, where they are bleffed with wholesome Chalybeats, and Company reforts for the Use of them. The more various these Diversions are, the more Benefit is reaped by the Water-Drinkers from them; provided they are used with Difcretion. The Water-Drinkers at Cleves have other Advantages, which most other such Places of Refort cannot boast of; because they can ever shift themselves to one delightful Place or other, among the Neighbouring Towns, fuch as Marienbaum, Xanten, and Wesel, which are not only very diverting Places, and worth the Sight of Travellers, but will also entertain them with a View of the most elegant and famous Military Exercifes of the Prussian Soldiery. They have likewise the Attraction of Eltenberg, Emmeric, Schenckenschans, Gog, Neu Closter, Mook, and feveral others, which may be repaired to according as the Conveniences and Diversions, which each of them feverally claim, are agreeable to the Taste and Choice of the Company.

But all the principal and polite Entertainments at other *Spaws*, fuch as Balls, Assemblies, Concerts of Vocal and Instrumental Music, &c. are not wanting at *Cleves*: So that it may be justly said of this Place, that it can entertain all its Visitors suitable to their own Inclinations.

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CHAP. VII.

Containing a short and historical Account, in which Manner, and by what Means, the Chalybeat Waters at Cleves were first discovered.

ROM the preceding Chapter, concerning the Description of the Situation and Boundaries of the Town of CLEVES, it appears, that this Town is furrounded with Hills and Mountains; and though these Hills are not fo steep, high, and barren as the Mountains in the Mineral Countries commonly are, but fertile and productive of many excellent Herbs, and all Sorts of Timber, and other Necessaries; yet Mr. De Vries assures us, in his Description of Cleves, that the Mineral taken or extracted from the Mountain, called the Butter-Mountain in the Park (the very Mountain from whence the Chalybeat Fountain flows) upon a proper Trial was found to contain Copper and Iron; and that this Mountain was also enriched with an excellent Clay, proper and fufficient to make the finest and best earthern Ware: This is the whole that Mr. De Vries tells us of the Matter; but I cannot learn or hear of any fuch Trial being made for Minerals or Metals in the Mountains near Cleves: Yet it is probable enough, that these Hills do contain a Store of Copper and Iron, and other Metals; and

that there is great Reason to suspect such, will appear, from what I shall advance on this Head.

That there is a great Plenty of Iron-Ore in these Mountains, is indisputable; since it appears, that the low Lands adjacent abound so much with the Stone called the Iron-Stone, which strong Symptom was one of the chiefest and greatest Inducements to Dr. Schutte to search for the Chalybeat Spring. That these Mountains at Cleves contain a Plenty of other Minerals likewise, is undoubtedly suggested and made appear by many reasonable and undeniable Proofs; and in particular, the several Sorts of Pyrites plainly indicate the Truth of this Suggestion, as they are certain Signs of the Variety of the Metals or Minerals they yield.

Near these Mountains have frequently been found great Quantities of Crystal-Stones, very beautiful, and far superior to those of Bristol. Infomuch, that an eminent Jeweller in Amsterdam was deceived by the delicate Lustre of one of them, and looked upon it as a real Oriental Diamond; the Particulars of this Story are told thus: Prince Maurice of Nasjau having procured one of these Stones of a very beautiful Colour, and, after having it properly polished, sent it to a Jeweller at Amsterdam to be set, who taking it for a real Diamond, of an extraordinary Value, it induced him to think of an Imposition upon the Prince, which he effected, by exchanging a real Diamond of a fmaller Size, and fetting

it in its Stead; the Prince, who was a great Connoisseur in precious Stones, discovered the Jeweller's Error, and was greatly pleased with

the Finess.

These Stones, wherever discovered, are certain Signs of Minerals; and the Boundaries of all Medicinal Mineral Water-Fountains are full of them: The Neighbourhood of the Medicinal Water-Springs at Bristol and Bath are near Instances of this Assertion, where these Stones not only are in plenty, but many other Concretes of the same Kind, and all Mineral Springs are accompanied with them; so that, where Stones of the sparry or Lapis Specularis Kind are discovered, we may freely search for Mineral Waters.

To give a very particular Account of the Discovery of the Chalybeat Waters at Cleves, I will extract the same from Dr. Schutte's History, which he published in the Year 1742, wherein he gives us, in his second Chapter, a plain Account of this Affair; and from another Book since published (which treats more largely on this Head) intitled, The A-

musements at the Spaw of Cleves.

Dr. Schutte, who for many Years has been the appointed chief Phyfician at the Chalybeat Water-Fountains at Schwelm, (a remote Place in the County of Mark, in Westphalia, where great Numbers of People refort) has had the best Opportunities of searching and examining into the Nature and Virtue of these Waters, and of becoming a perfect Master of their particular Qualities; and more particularly

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larly fo, as he has a good natural Share of Knowledge in Mineralurgia: The Doctor had always great Inclinations to fearch after a good Chalybeat Water in the Mountains near Cleves, and as he had discovered great Quantities of Iron-Ore, commonly called Iron-Stone, in the Neighbourhood of Cleves. this Discovery was a strong Inducement for the Undertaking of this Work; accordingly he began his Search, and examined all the Water-Springs and little Rivulets, and particularly those in the Park, near the Butter-Mountain (knowing them to be rich in Iron-Ore.) This Examination, after great Sagacity and Pains, proved successful, for, upon difcovering, near one of the Pipes that conveys the Water to the Water-works, by the Means of a Leak in the Pipe, a Sediment peculiar to the Medicinal Mineral Waters, the Doctor discovered it by its Taste to be a very good Chalvbeat or Mineral Water, and had the Satisfaction by trying it with Galls to fee it turn instantly Purple, and afterwards to a Blue Colour.

Thus the Doctor fucceeded in his long wished-for Design, in discovering and establishing the falutary Chalybeat at Cleves: And, as it is reasonable to imagine, that the Doctor pursued his Discovery, he proceeded, and hereupon opened the Water-Cock, that conveys the Water from the Receiver into this Pipe, from whence the Mineral Water came: When, first, a fine Black, then a Red, and, at last, a more Yellow Iron-Earth appeared; then

then the clear Water came, that had not any Mineral or Chalybeat Taste (which was the Water of the third Receiver) and did not in the least partake of the Principles of the Medicinal Waters: He therefore closed the Cock again, and, in the Space of half an Hour, the Water, that came from the Leak of the Pipe, was a very good Chalybeat; the Doctor thereupon justly concluded, that there must be another Leak in the Pipe, through which this Mineral Water entered from some Chalybeat Spring from the adjacent Mountain: For the farther Discovery of which he pursued his Design by Means, which will

appear hereafter.

Thus far the Doctor advanced in his Difcovery; but then it was difficult to determine what Quantity of Water there might be, whether, or no, there would be fufficient for Bathing or Drinking, to answer his wellgrounded Purposes, and to recompense him for the great Pains he had taken in the Attempt: This was not to be determined but by digging and opening the Ground; it was indeed well known, that there was Plenty of Water in the Mountain, but the Difficulty was to discover if there was Mineral Water enough contained therein, which could not be known but by Trial: Because this Experiment could not be made by the Mineral Water Magnet, as the Mountain was fo full of Iron-Ore and common Water, which, when together, or near each other, the Magnet will operate upon them, as upon a Medicinal dicinal Mineral Water of the fame Nature; then as common Water and Iron-Ore, though often found together, yet do not always unite, so as to constitute a Chalybeat Water, these Circumstances created great Difficulties towards the Discovery; for which Reason, the Doctor concealed his Intentions and Pro-

gress for many Years.

But, notwithstanding the many Difficulties the Doctor encountered in the Pursuit of his Discovery, many favourable Indications still daily encouraged him, and fully perfuaded him, that he should surmount them all by a diligent and laborious Examination; for which Purpose, he first enquired of those Labourers, who were employed in digging the Foundations of the Amphitheatre, if they had in their Works ever observed or met with in the Bowels of the Earth a yellow Water; the Labourers observed to the Doctor, that there were fuch Numbers of Water-Springs flowed from the Mountain in one Night's Time, that retarded their Work for laying the Foundation, infomuch that they were obliged to fecure their Works, by the driving of large wooden Piles into the Ground, and by fupporting it with large Planks or Boards; but as to the Colour or Nature of these Waters they observed nothing; but told the Doctor, that the Earth, whereon the Foundation rested, was of a red Colour, from whence he concluded by these Accounts, that the Mineral Water Spring (as he before conjectured) must inevitably lie behind the Gal-

lery,

lery, in Search after which it was necessary, in the first Place, to procure more Miners; and, as there had not been any Instances of Trials being made before in Search after Minerals at Cleves, the Town confequently could not furnish the Doctor with Persons proper for this Undertaking; but very fortunately, about this Time, it happened, that a Ship fell down the Rhine in its Passage to New-England, which was stopped near Schenkenschans, about two Leagues distant from Cleves; among the Crew of this Ship, who were Palatines, the Doctor found out three Miners. and engaged them in his Service; and on the 20th of June, N.S. in the Year 1741, they began this Undertaking, by purfuing, with great Pains and Fatigue, the little Spring first discovered near to the Pipe of the Waterworks, which when they had uncovered, they discovered that the Mineral Water entered into this Pipe through a Leak, as fufpected. They purfued this Water into the Mountain, and were obliged, with indefatigable Pains, to fink a Pit, which caused a more than ordinary Trouble to the Doctor; for, as the Mountain contained fo many Springs, he was obliged to be continually with the Labourers, to examine each Water with great Care, and to prevent them from mixing with each other, which would inevitably spoil the Chalybeat Waters, and frustrate his whole Defigns. However, in about the Space of four Months, he compleated this Work, fo far as to put a Receiver for the

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Water into the Pit, which when executed, he defisted from any farther Proceedings, and locked up the Pit for this Season. And in the Month of March following, after having procured three other Miners from the County of Mark, he again purfued his Undertaking. and ordered them to fink a new Pit behind the Amphitheatre, in the digging of which 28 Feet deep in the Earth, they discovered an Iron-Ore and a Mineral Water, but they were fo interspersed, and mixed with common Water Springs, that it was impossible to feparate them from the true Chalybeat; upon which, the Doctor ordered them to be shut up, and directed his Workmen to open and unlock the Well, which was dug the Year before, from which he conveyed the Mineral Water through a long Pipe into a proper Receiver erected for that Purpose, over which was built a convenient Place to drink the Waters in; but afterwards, Orders were given for the building of a fine and ornamental Piazza of Stone, which not only ferves the Purpose of a Drinking-House, but adds much Beauty and Splendor to the whole Place. Over the Receiver, from whence the Mineral Water is drawn for present Use, the following Inscription is affixed:

CREATORI

C R E A T O R I.
Deo. Ter. Opt. Max.
Omnis Boni.

Unicae. ac. Vivae. Scaturigini. Sacrum.

Sub Imperio.
Celfissimi. Et. Augustissimi.
Principis

Friderici. II.

Magni. Borufforum Regis
Anno MDCCXLI
Tempore Belli.

In Silefia. Feliciter gest. Hic. Fons Mineralis

Est detectus

Et Anno Sequente Post

Binas. Victorias.

Ac Vrati

Pacem Wratislaviensem
In Salientis Aquae Formam."
Redactus.

Et

Dei Clementia.
In Languentium
Salutarem Ufum Medicum
Optato Effectu
Collocatus.
Ab Inventore

Jo. Henrico Schutte Med. Doctore.

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In English thus:

Sacred to the most High and Great God, Creator of all the Earth, the only and living Fountain of all Good.

Under the Reign of the most High, Puissant, and August Prince, FREDERIC the Second, KING of Prussia, in the Year 1741, during the War that was successfully carried on in Silesia, this Mineral-Spring was discovered, and in the Year following, after two Conquests and the Peace of Breslaw, successfully set up in the Form of a Cascade by the Discoverer,

John Henrick Schutte, Doctor of Physic.

Thus far the Doctor compleated his Difcovery, and executed this great Undertaking; but being in continual Search, after more Chalybeat Springs, he discovered another not far distant from the already compleated Mineral Water-Well, which being more strongly imbibed by grofs, fulphureous, Mineral Vapours, than those Waters in the Well before-mentioned; and therefore, confequently, not fo falutary for inward Applications, as for Bathing: He ordered a proper Receiver for this Spring, from whence the Artificial Chalybeat Baths are prepared, and used with great Success. All necessary Preparations now, after indefatigable Pains of the Doctor, being compleated for the Reception of those who thought

thought proper, or had Occasion to use these Waters, having first published abroad, and advertised them in the publick Papers of Holland and Germany; he opened the Season for Drinking, on the 17th of July 1742, which was attended with great Success; for great Numbers of People resorted thither for the Improvement and Recovery of their Healths, and as they received extraordinary Benefit from the Use of them, the Company considerably increased Yearly: The Doctor continued this first

Season till September the 15th, N. S.

Dr. Schutte, who has very deservedly gained great Reputation and Honour by this Difcovery, could not but take Notice and complain with great Justice of the many Discouragements he met with in the Pursuit of his Discovery, from many idle and ill-natured People, who, either from Defect of Knowledge in these Matters, or from natural Inclination to defame fuperior Merit, took improper Liberties with the Doctor, and vainly endeavoured to decry and fubvert his noble and truly effeemed Defign. But all these ill-natured Reflections of defigning People did not discourage the Doctor from his laudable Pursuit; and indeed, when we confider, under whose Patronage and Protection he was employed in this Undertaking; even under the most gracious Approbation of his Prussian Majesty, who is a Prince both too steady and just to give Ear to the idle Conjectures of conceited People: I say when we consider this, the Doctor was proof against any Persons whatever, that were inclined to attack

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tack his Reputation; however an audacious Attempt to frustrate a Design so beneficial to the publick Good, could not but call for Refentment in fome Kind: But, more particularly, the Doctor complains very heavily of some Gentlemen of the Faculty and the Apothecaries, who took great Pains to condemn and explode the Reputation of these salutary Waters, looking on them, as great Obstructions, if not a total Destruction, to their Fees and Sale of Drugs. To these may be joined another Set of Gentlemen of the Faculty, who through Want of Knowledge, being unacquainted with the Nature of the Chalybeats and other Medicinal Mineral Waters, have taken upon them with Authority to condemn their Power and Virtue. But all these united Attacks both against the Doctor and his falutary Remedies, were infufficient to gain any Profelytes to their bad Cause; except some of their own Herd, whom private Interest united thro' Fear of coming to Destruction; for his King was too wife to be baffled out of Reason by such Incendiaries.

I cannot but here remark, what Difficulties and Obstacles most Projectors meet with in Search of new Discoveries, which, tho' intended for the universal Good of Mankind, meet not with that Candour and Encouragement they deservedly merit: And a great Missortune it is, that this Matter is not taken into some Consideration, as so many public Advantages to Mankind would consequently accrue. And I beg Leave to observe, among all the Nations that I know off, the English in my Opinion give

the

the least Encouragement to a Projector; nay very often, a happy Invention destroys him, here; as there are commonly a Set of People, to whom if the Projector allows not the whole Profit to themselves, and even the Honour of the Discovery too; they endeavour to find out fome Method to frustrate the whole Undertaking: and if, by chance, an useful Discovery should force its Way into the World, it is often attended with greater Difficulty than the Discovery itself, witness the Discovery of the immortal Harvey, viz. of the Circulation of the Blood, where it cost him more Pains and Trouble to gain Faith and establish a firm Belief of this most useful and grand Truth, than the Difcovery itself: Almost innumerable other Instances I could produce, but, their being so common, it would be needless to mention any more.

CHAP. VIII.

The Mineral Contents in the Chalybeat Waters at CLEVES, attested and proved by Experiments.

A Lthough the Mineral Spirits in this Chalybeat Water, are of so volatile a Nature, as not to bear Exportation, from their Evaporating in a few Hours after they are taken out of the Well, and the Disunion of the whole Water-Concrete; yet, by his P 2

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PRUSSIAN MAJESTY'S Directions, there was some of the Water sent, in Winter, to the College of Physicians at Berlin, in Order to have Experiments made on it: And, notwithstanding the Spirits were mostly exhausted, there was still enough left in the Body of the Water, and its Sediment; whereby, on due Experiments, to pronounce with Certainty, that this Chalybeat Water was endowed with the same constituent Parts or Contents, as the Waters at Schwalbach or Egra; and, if drank at the Fountain-Head, would indubitably produce the same good Effects.

But as Experiments on Chalybeat Waters, made otherwise than at the Fountain-Head, are not invested with sufficient Authority, nor afford Certainty enough to establish safe Conclusions on, such as those made at the Fountain-Head, incontestably furnish; Dr. Schutte having made very precise and exact Experiments on this Mineral Water upon the Spot, I will here deduce them, and from thence conclude the essential Properties and Quality of this Water.

I. A Glass full of this Mineral Water, in a warm clear Day, taken out of the Well, and exposed open to the Air, is first Crystal-clear, like common Spring-Water, without any Mineral Particles to be seen in it; but, after standing a little Time, there settle innumerable little Bubbles, of a globular Form like Pearls, on the Sides and Bottom of the Glass:

Glass: These Pearls gradually rise to the Surface of the Water, then burst and vanish; but, as long as they continue under Water, they preserve their Form and Figure undiffolved.

II. The warmer the Air is, the fooner these *Pearls* or *globular Bubbles* appear; but in a cold, cloudy, or misty Air, they are, in Proportion, slower in forming as well as dis-

folving.

III. When this Water hath fo remained in the open Glass a short Time, it will first change to a milky Colour; and the Pearls or globular Bubbles will continue to emerge to the Surface, till the milky Colour in the Water gradually changes red, and ultimately be-

comes dark and cloudy.

IV. When the Water is thus changed into a red dark Colour, then the Iron-Earth separates from the Water, and subsides gradually to the Bottom; in the Form and Appearance of a fine yellow Powder: In the mean Time, the Top of the Water is covered with a shining Surface, or Cuticle, which appears first of a pearl Colour, then of a yellow Colour like Gold, and at length of a Copper Colour; till at last, this Cuticle assembles a great many beautiful Hues, very much in the Manner of a Peacock's Feather: At which Point of Appearance, the State or Texture of this Water is broke and altered.

V. By these Experiments may be inferred and observed, that every globular *Bubble*, mentioned in the second and third Experiments,

P 3

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carries a small terrestrial Atom; so minute as to be scarce perceptible to the naked Eye, to the Surface of the Water, altogether forming that shining Cuticle on the Water, which, according as it increases by their Appulse,

changes Hue as above-mentioned.

VI. When, by the inward Workings of the Water, the Emergence of the globular Bubbles is ceased; the Water changed into a yellow Colour, and the Cuticle on the Surface of the Water arrived at its last Period, the component Particles are separated, the Texture altered, and the Water loses its original Mineral Taste.

VII. When this Water, thus changed and discomposed, has stood two or three Days, without Interruption; the yellow Iron-Earth continues sedimented at the Bottom; but the Water becomes again Crystal-clear, and will for a long Space of Time remain liable to no Change; but preserve a small Taste of the Salt it contains.

VIII. When the Contents are thus feparated from the Water, and that Water is decanted into another Glass, it will not strike

any Colour with the Powder of Galls.

IX. When this Water, conformable to the Experiments V,VI, and VII, has undergonethe Difunion of its Parts, and its original Texture is fo far broke; that the *Iron-Earth* is fedimented, and the Cuticle on the Surface formed: Then gradually infuse *Spirit of Vitriol*, fo much as is perceivable to the Taste, and let it stand uninterrupted for a few Hours;

the

the Sediment and Cuticle will then be diffolved, and re-incorporated with the Water, which will become Crystal-clear again, without any Thing extraordinary to be seen in it; but, with Galls, strikes a very deep Blue.

X. With Powder of Galls, it strikes a deep

Purple, which changes blue at last.

XI. With the Bark, and Saw-dust of Oak, severally, it strikes first a Violet and then a deep blue Colour.

XII. The Leaves of Green Tea, after they have been some Time in this Chalybeat Water, (cold) strike first a purple, then a brown, and

at last a deep blue Colour.

XIII. Fine powdered *Pomegranate-peels* make this Mineral Water first of a *Violet*, then of a *deep blue* Colour, occasion a blackish Sediment, and on the Surface of the Water gather a dark *brown* Cuticle.

XIV. An Infusion of the Herb Veronica strikes first with this Medicinal Water a Violet,

and then a deep Blue.

XV. The Syrup of Violets occasion a very

geeen Colour.

XVI. The Powder of Terra faponica, a red, pretty much of the Colour of the oriental Hyacinth; then a Violet-blue, and at last a brown-

ish black colour.

XVII. Good Rhenish Wine and fine Sugar in Powder mixed together occasion a Fermentation, or more properly an Ebullition, such as the Pouhon and Pyrmont Waters, and tastes very gratefully. With French Wine, it has no Motion whatever, but tastes very agreeably,

bly, as it likewise does with any other Red Wine of the Nature especially of Florence Wine.

XVIII. Some fresh Milk was taken in warm Weather, and exposed in an open Glass, and in another Glass of the same Milk mixed with this Chalybeat Water, and set together in one Place, where it was next Day found, that the pure Milk was sour; but that mixed with the Mineral Water had neither lost its natural Taste, nor was in the least altered.

XIX. The same Experiment was made with boiled Milk; when it was found, that the unmixed Milk was on the Turn the second Day; but the mixed did not turn four till the fourth.

XX. Oleum Tartari per deliquium causes a Precipitation with this Water, and the Sediment thereby produced, is of a yellowish-green Colour.

XXI. This Water also precipitates with Sal-Armoniac, a Sediment which at first appears of a true green Colour; but, in some Hours, it changes into a greenish yellow, or

Parrot-coloured green.

XXII. The Spirit of common Salt occafions not any Precipitation in this Chalybeat Water, but entirely prevents it; infomuch, that it maintains the Water in its Texture, fo that it neither produces a Sediment nor Cuticle on the Surface; but the Water becomes of a yellowish Colour, like French Brandy.

XXIII.

XXIII. This Water, with the Spirit of Nitre, proceeds the same, as in the foregoing Experiment with the Spirit of common Salt.

XXIV. When this Water is mixed with the common Spirit of Vitriol, it preserves it in the original Crystal-clear Texture, without suffering any Sediment of the Iron-Earth, nor the Cuticle to appear on the Surface: And the Water, thus mixed, will keep clear in its original State, though exposed in the open Air, for many Weeks.

XXV. Common Vinegar occasions a little Motion or Fermentation with this Water, but preserves it in its original State of Clearness.

XXVI. Cremor Tartar preferves likewise this Mineral Water in its Texture, so far as not to occasion any Sediment or Cuticle; but tinges the Water with a light yellow Colour.

XXVII. A Solution of Pot-Ash occasions no Motion or Effervescence, but produces a yellow Precipitate, which, when settled, the Water above this Sediment clarifies again, and nothing like the Cuticle appears on the Surface thereof.

XXVIII. Dissolved Allum, gradually poured into this Mineral Water, occasions a small Effervescence; but not so much as with Aquafortis.

XXIX. A Solution of common Salt, in Mixture with this Chalybeat Water, occasions a great Motion; but they remain clear, and no Sediment appears.

XXX. When this Medicinal Water is taken in a Glass, to be evaporated in a Sand-heat,

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heat, then the globular Bubbles or Pearls mentioned in the Experiments I. and II. appear quicker and more numerous; the coloured Cuticle forms fooner on the Surface, as does the Sediment at Bottom; and when the Water is evaporated, the Sediment with the Salt remains.

XXXI. The Colour of the Sediment is not always the same, but differs according as the Operation is performed; that is to say, if done with a gentle flow Fire, or a quick one, in an earthen Boiler, or a Metal one, over an open Fire or a Sand-heat; all which Differences in the Process vary the Colours respectively, which is also observed with Regard to the several Sediments of Pyrmont, Spaw, Schwalbach, and other celebrated Chalybeats; and commonly little white Specks are to be discerned on those Sediments, which are the natural Salts of these Medicinal Mineral Waters.

XXXII. When upon this yellow Sediment (or in whatfoever Colour it appears) is poured distilled Rain-Water, with sufficient Time to dissolve the Salts, then filter the Mixture through a Paper; the Salts go off with the Water, but the Iron-Earth remains in the Filtrum; and, in this Manner, the Separation of their Contents are obtained.

XXXIII. When this Water is evaporated to the Confistence of Crystallization, and then disposed in a proper cold Place for Shooting, by this Means will be obtained the true Mineral Water Salts.

XXXIV.

XXXIV. This Iron-Earth, which the Salts are feparated from, in the Manner above-related (Experiment XXXIII.) dry in a Crucible by a clear Fire; then, very well reverberated, will become of the Colour of Crocus Martis; when cold, and levigated to a fine Powder, the Magnet will attract it, like Filings of Iron.

XXXV. When a Crucible full of this Iron-Earth, thus extracted from the Mineral Water, is reverberated, the Smell of the Principium inflammabile, or Phlogiston, is very perceivable during the Operation; but in an agreeable Sense, and no wise nauseous or suffocating like the Smell of common Brimstone.

XXXVI. When upon the Sediment, or yellow *Iron-Earth*, of this *Chalybeat* Water, is poured the *Spirit of Nitre*, a Smoak arises, followed by an Effervescence.

XXXVII. Spirit of Vitriol causes also an Effervescence and Smoak, when in Mixture

with this Sediment or Iron-Earth.

XXXVIII. With Aqua-fortis, this Sediment, or Iron-Earth, makes a very strong Effervescence, accompanied with a Smoak that

fmells very fulphureous.

XXXIX. When upon this Iron-Earth, or Sediment, is poured Aqua-fortis sharpened with a small Quantity of Spirit of Sal-Armoniac, setting it in warm Sand, it will yield, in Extract, a saturate yellow Tincture.

XL. The Salt separated from the Sediment or Iron-Earth, as related Experiment the

Thirty-

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Thirty-second and Thirty-third, has a pungent bitter Taste like to Arcanum Duplicatum; causes no Effervescence in Mixture with Acids, and consequently, may be ranked as a Sal medium, or neutral Salt.

XLI. A Piece of Silver, laid in this Chalybeat Water for twenty-four Hours, was not

visibly discoloured or blackened.

XLII. When this *Chalybeat* Water has been conftantly drank for eight or nine Days, out of one Glass, the Sides thereof are very much furred with the *Mucilage* of Iron, of a yellow Colour, of a *bituminous* Nature; so as not to be cleanfed, or yield scarcely to the

hardest Scouring.

XLIII. When in the Summer, in the Heat of the Day, about Noon, this Water being carried in a Glass-Bottle well stopped and cemented, from the Spring to the Town; it will suffer a very visible Change and Alteration of its natural Colour, even in so short a Way; and the powdered Galls neither strike so soon a Purple, nor so strong a one as at the Well.

XLIV. But if this Water is, in the Morning before Four o' Clock, carried to Town, in well cemented Bottles, it will preserve itself two or three Hours in its primitive Quality and Property to be used, or medicinally taken.

XLV. In Winter, if carried to Town, with the above Precaution, it will remain clear for feveral Days, retain the Mineral or Chalybeat Tafte,

Taste, and strike a purple Colour with Powder of Galls.

XLVI. This Medicinal Water being in a corked and cemented earthen Jug, and in Winter, during a Frost, exposed to the most intense Cold; the Water will freeze to Ice, on the Sides all round the Inside of the Jug; and the volatile Spirits of Vitriol will concentrate inwards, in the Space that remains unfrozen.

XLVII. When the Jug is opened, and a Hole bored through the ambient Ice, the Water containing the Vitrioline Spirits will run off, and the frozen Water remains in the Jug.

XLVIII. The Water, in which the Vitriolic Spirits are concentrated, taste very strong and unpleasant; so that they are by no Means so grateful to the Palate, as the fresh Water

at the Spring-head.

XLIX. The Powder of Galls, in Mixture with the Water, in which the faid Vitriolic Contents are concentrated, strike instantaneously a deep blue Colour, much quicker than with the fresh Water from the Well.

L. When the *Ice* in the *Jug* (Experiment XLVII) is dissolved, it becomes Crystalclear Water again; yet, with *Galls*, it strikes only a pale: Whereas that Water, containing the *Vitriolic Spirits concentrated*, instantly strikes the deepest Blue, as before observed, Exper. XLIX.

LI. That Water of Concentration is cloudy, of a faturate yellow Colour, but the Water, returning

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clear as Crystal.

LII. The Water, with the concentrated Chalybeat Contents, when exposed to the Air, precipitates more Iron-Earth or Sediment, than the same Quantity of fresh Mineral Water at the Well-head; but the Water obtained from the Ice, retains no Mineral Taste, nor occasions any Sediment or Cuticle on the Surface of the Water.

LIII. This Chalybeat Water is full two Degrees lighter, than the common Water that can be found in the Neighbourhood of Cleves, which for light, hearty, common Water is remarkably famous.

These are the Experiments I have thought the most worthy of Notice, and of setting down here, on the Subject of this samous Mineral Water at Cleves; in Virtue sar superior to that of the Geronstere Spaw, which has hitherto been in more Repute for the Cure of chronical Disorders, and with which it differs not much in Taste.

Dr. Schutte, who has, on both these Waters, made very nice and accurate Experiments, writes me, that the Geronstere Spaw possesses more common Salt; but then, that at Cleves is more richly impregnated with the Mars, or Chalybeat Contents, and therefore more efficacious and salutary than the Geronstere Spaw; which is evinced and testified by the Waters at Cleves striking sooner and easier their respective Colour, than those at Spaw;

as well as by a Number of Cures they have wrought in the most desperate Cases, in many Distempers.

This Gentleman also writes me, that five or fix Drops of Solution of common Salt will make a Pint of the Water at Cleves taste ex-

actly like the Geronstere Spaw.

That the Geronstere Spaw has been, and continues to be frequently imported into this Metropolis of London, I know, and at which I am greatly surprized; because these Waters, when they have lost their Spirit, are so hard, unkind, and heavy to the Animal Oeconomy, that they are rather of a petrifying Nature, so as scarcely to be digested with the strongest Animal Motion; at least, no Good can be expected from them, unless precisely drank at the Fountain-head.

The Poulon Spaw and the Pyrmont Waters are the best, that bear Exportation from Germany; and these, with the Selter Waters, are the only Foreign Mineral Medicinal Waters, that can be usefully imported here on

this Island.

The Mineral Water at Cleves is also superior to many other famous Chalybeat Waters, in Regard to their sovereign Lightness; a Property in them not to be wondered at, when we allow for the natural Advantages this at Cleves is peculiarly endowed with: Its Passage, for Example, through a compact sandy Bed of Clay, in its Nature not unlike the famous filtring Stones, that are brought from the Canary Isles; when other the like Waters,

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as at Spaw or elsewhere, spring out of Rocks, and sensibly shew their Want of this Filtrum, which not only cleanses and lightens the Water, but also refines the Mineral Contents: And consequently they get sooner into the Sanguistication, as well as discharge themselves more readily by Urine; whereby the Mineral Contents acquire and exert more Power in their Action, towards producing their salutary Essets.

From the above Experiments we may fafely draw a few Confectaria, or Corollaries, tending to establish and prove, beyond all Exception, that this Spaw at Cleves is a Chalybeat, impregnated with Mineral Contents, of singular Virtue and Essicacy towards the Cure of several chronical and inveterate Disorders.

Corollary the First.

That this volatile Quality of these Waters is of an Acid Nature, commonly called a natural volatile Spirit of Vitriol, is now out of Dispute: As also, that it is of a very subtile Atherial Quality, imbibed with the Phlogifton, and other Mineral Contents, which may not improperly be stiled the Quintessence of Fosfils, appearing, perceivably to us, in the Cavities of the Earth like Vapours or Damps; which Contents are the chief Ingredients of this Water, and the great Sources of its falulatary Operations; as may plainly be collected from the following Confideration: To wit, that this Water continues its Force and Efficacy, fo long as these Mineral Contents remain

Mineral Waters at Cleves. 225 remain in Union with the Water; but, as foon as they are evaporated, it is intirely deftroyed, changed, and lofes its Temperature and Energy. See Experiments VI, VIII.

and IX.

Corollary the Second.

The Striking of purple, blue, and black-brown Colours with Powder of Galls, Green Tea, Herb Veronica, Pomegranate-peels, Terra-fapanica, is owing or occasioned by this volatile Spirit of Vitriol, and the Iron-Earth it contains diffolved in this Water. See Experiments X, XI, XII, XIII, and XIV.

Corollary the Third.

That the Ætherial Vitriol Spirit is not of a sharp corrosive Nature, or heterogeneous; but, on the contrary, salutary, kind, and homogeneous to the human Constitution, is manifest from its Mixture with the Milk, occasioning no Coagulation whatever. See Experiments XVIII, XIX.

Corollary the Fourth.

From these Experiments on Milk, it like-wise appears, that this Medicinal Water may be safely, and without Inconvenience, used or drank with Milk, in such Distempers where the particular Case or Circumstances of the Patient, such as Weakness, Decay, &c. &c. require it.

Corollary

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Corollary the Fifth.

For a Proof that the volatile Vitriol Spirit, or Mineral Contents, will not permit the Transport or Exportation of this Water, either for Experiments or Medicinal Use; but by all Means is to be used or taken at the Spring-head; see Experiments XLIII, XLIV.

Corollary the Sixth.

That a fixed Vitriol Acid continues or preferves this Water in the original Texture of a Crystal Clearness, may be ascertained by Experiments XXII, XXIII, XXV, XXVI.

Corollary the Seventh.

That when the natural volatile Vitriol Acid is evaporated from this Chalybeat Water, the Iron or Chalybeat Contents subsided, and the Cuticle, like Peacocks Feathers, is gathered and formed on the Surface; the Vitriol Acid thereto affused, dissolves the Sediment and Cuticle, and restores this Water to its natural primitive clear State again, appears by Experiment IX.

Corollary the Eighth.

That this Medicinal Mineral Water contains an *Iron-Earth*, which after it has been reverberated ftrongly in a Crucible, the Magnet will attract the fame, may be noted in Experiments XXXIV, XXXVII, XXXVII, XXXVIII, XXXIX.

Corollary the Ninth.

That the Iron-Earth of this Mineral Water contains Part of the Phlogiston, or Principium inflammabile, which carries not with it such a nauseous, suffocating Smell as the common Sulphur, and which cannot be separated from this Chalybeat Content, the XXXVth Experiment shews.

Corollary the Tenth.

That this Mineral Water is endowed with a Sal medium, or a neutral Salt, occasioning no Effervescence with Alkalis or Acids, is clear from Experiments XXXII, XXXIII, XLI.

Corollary the Eleventh.

That this Chalybeat Water is lighter and cleaner, than the best common Water at Cleves, which is even famous on the Account of its being remarkably light and clear; see Experiment XLIII.

Corollary the Twelfth and Last.

That this Chalybeat Water, or the Spaw of Cleves, contains all Ingredients, Mineral Virtues, and every other Quality of a Medicinal Mineral Water, commonly called Chalybeat Waters or Acidulæ, proper and falutary to be used for Relief in several chronical Diseases; appears plainly on the Sum of these Experiments; as well as from repeated Instances of their Success, in very desperate Cases.

CHAP. IX.

Chalybeat Waters, their Mineral Contents confidered, and their Medicinal Virtue, Power, and Action upon the human Body, explained and accounted for; particularly those of CLEVES in GERMANY.

TAVING in the first and second Chapters suggested the most rational Account I could yet discover, how, and by what Means the Element-Water is changed in the great subterraneous Laboratory of Nature, and compounded into a salutary Medicine, and of the Materials, with their Process of Operation; I shall treat in this Chapter of the Medicinal Power and Efficacy of the Mineral Contents in these Waters.

But I cannot help first premising my Regret, of what appears to me a great Deficiency, or Desideratum, in the Study of Physic; in that the Professors of this Science, so necessary to the Well-being of Mankind, in their Lectures to their Pupils or young Students on the Materia Medica, hardly ever touch on, or mention the Mineral Waters. And to this Omission, as I apprehend, it may be imputed, that either these valuable Medicines are too little known, regarded, or introduced into Practice; or are abused by unjudicious, unmethodical, and empirical Prescriptions

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fcriptions of them: For, had these Waters been duly treated of, in such regular Lectures, and made the Object of Study and Examination; we might probably be able to give a better Account of their Properties, Nature, and Essence, together with their Causes and Modes of Power and Action on the human Body, collected from a more extensive Investigation, than has been hitherto obtained in this material Branch of the Materia Medica; and for Discoveries, in which we might perhaps have seen more than one Genius spring up, when once put into the proper Track.

But, as we labour under this Deficiency, we can only make the best Use of such Opinions, as we can collect from the most eminent of those Authors, who have treated on this Subject; to whose Knowledge and Lights therein I gladly do Honour, and whose Mistakes I deem highly excusable, from the natural Abstruseness and Obscurity of the Matter: Some of these I shall here quote, in Support of my own Opinion, which I shall likewise freely give, under Appeal to those facred Guides, Experience and the Love of Truth; how, and in what Manner the Mineral Contents perform their Medicinal Office and Operations. And though I derive what I advance thereon, especially from the Waters of Cleves; what I shall say relative to them, will be fo abstracted, as to bear a competent Analogy and Application to all Waters of the fame Nature.

Dr.

Dr. Jorden says, Page 125, "That the Qualities of the Medicinal Mineral Waters are seldom one or two, but commonly more: These Qualities are either first, as hot, cold, moist, dry; or second, as penetrating, astringent, opening, resolving, attracting, cleansing, mollifying, &c. For the first Qualities, it is certain, and agreed upon by all Authors, that all Mineral Waters do dry exceedingly, as proceeding from Earth; but some of those do cool withal, and some do heat."

Now, in Regard to the drying Quality, which the above Author attributes to Earth, he is fo far right, as this Quality is owing to and proceeds from the Iron-Earth; which, however, he does not mention, or specifically distinguish, nor indeed, what Sort of Earth it is, to which he ascribes this Effect.

Iron-Earth, fingly, without a proper Corrective, will, in the human Body, abforb, and like a Magnet, attract all the Humidity out of the Animal Fluids, and discharge them, fo as in Course to produce Heat or Dryness, to a fanguine Constitution; and, for the same Reason, this Earth will operate as a Cooler to those, whose Constitution of the Blood is viscid or fizy: Since, by its magnetic or attractive Power, it will interrupt and flacken the Circulation, the Languor of which naturally cools the whole Body: This, however, opens to View a very falutary Confequence, which is, that the volatile Mineral Spirits, by their penetrative Power, open a Passage for

for the Water and Salts, by which Means the thick fizy spontaneous Gluten of the Blood may be properly diluted, and restored to its

healthy State again.

Another just and true Definition of the active Power of the Iron-Earth in the human Body, is given by Dr. Simpson, in his Hydrologia Chemica, Page 27, §. 20. " That the " Operation of Steel, whether Filings, Cro-" cus, or Sugar of Steel, is by coagulating " this excrementitious Salt, which, because " Acid, is therefore partly Mineral; for as " foon as the Steel aforefaid enters the Sto-" mach, and so passeth from the first to the " fecond Digestion in the Intestines, as it " paffeth along, the spurious Salt runs head-" long towards it to diffolve it, but inflead " thereof is coagulated thereon, spending its " Activity upon the Steel, lofeth its Acute-" nefs or Sting, and fo is carried away with " the Steel by Stool."

What Dr. Simpson here afferts, is a known and indisputable Truth; to which, however, it is proper to add, that by the same Rule, as the Iron-Earth, in the Manner thus pointed out, pervades the whole Animal System; it also entangles the Acid in the most extreme Parts, and carries it off either by Sweat or

Urine.

It is indeed much debated, whether an Acid can possibly exist in the extended, or any Parts of the human Body, the primæ Viæ excepted; or whether such an Acid can naturally be contained in the sound or unsound Q 4- Liquids

Liquids of Man or other Animals, fo that it may thence by Art be extracted; which Controverfy feems to me unquestionably decided in the Affirmative, by that most exact Experimentalist, Dr. Boerbaave *, as may also be eafily verified by daily Experience. For not only external Ulcers from a scorbutic Taint, or the like, that contain no digested Matter, but yield forth, instead of Matter, a clear Water-like Liquor, which clear Liquor will on Trial manifestly prove itself an Acid; but also the very Urine itself both of Men and Brutes will yield, or a common Salt may be produced out of it: Now, it being well known, that a common Salt cannot exist without an Acid, and as this Salt, thus produced from Urine, according to the Laws of the Animal Oeconomy, must have passed through the Circulation of the Blood, the indifputable Confequence follows, that this Acid must have been Part of the Blood, and other Animal Juices in the Extremes.

Dr. Simpson takes also Notice of the Disorders we are liable to, from Acids in the extreme Parts of our Bodies; and indeed he has given a lively Description of them, Page 116 of his pre-cited Treatise; where, however, it seems as if he relied more on the Salts, than the Iron-Earth, in his Assertion that the Salts of these Mineral Waters are the principal Agents or Anti-Acids. I grant him indeed, that these neutral Salts are salutary Remedies

^{*} See Dr. Van Swieten's Commentary on Dr. Boerhaave's Aphorisms, Sect. 60.

in the Case of an Acid, and undoubtedly they aid and affist the Iron-Earth. But, from what has been said already on this Subject, I apprehend him to be mistaken, and even not consistent with himself, when he attributes

this Quality to the Salts only.

The next Writer occurring to my Notice, is Dr. Haworth, who, in his Description of the Duke's Bagnio, Page 96, of the Chalybeat Waters in general, observes thus: "The chief " Virtue of these Waters consists in their di-" uretic Quality, for they work potently by "Urine. To fome Bodies they give a Stool " or two, especially if they drink them quick; ff they make the Excrements very black, and " the Urine pale: They dilute the Blood, " and diffolve those Salts, that are fixed upon " the Nerves, or other Parts, caufing acute " Pains and other Maladies, and force them " out of the Blood, through the Reins and " Bladder." To which he adds a Catalogue of Distempers, in which these Waters are serviceable.

But, in Regard of the Cleanness and Lightness of the Waters, Mr. Allen distinguishes
them most judiciously, and therefore I repeat
his own Words, Page 64, in his Natural History of the Chalybeat and Purging Waters of
England: "The extraordinary Virtue of this
"Sort (the light Chalybeat Waters) consists in
"that, as the Chalybeat Principles are in these
"most clean, so the Spirit is most thin, and
the Water both light and thin; and so we
have their Virtues not only most full here,
"but

" but fomewhat differing: They invigorate the Blood without Heating, penetrate fur-

" ther without Inconvenience, volatilize, at-

" tenuate more, and their Acidity goes off without leaving any preternatural Impref-

" fion behind."

This fame Mr. Allen gives also an Account, in his Book now quoted, from Page 71 to 82, of Hypochondriacal Disorders, where he fixes the Seat of the malignant Matter of this Distemper in the Chyle, which he has observed to increase, on using fermented Liquors; but always found that Acids, either Spirit of Vitriol, or obtained from Sulphur, used with common Water, which is void of Fermentation, have given Relief in this Disease: This, it seems, induced him to send Numbers thus afflicted to Tunbridge-Wells in Kent, for the Use of the Chalybeat Waters, where they answered to his Wish.

The celebrated Dr. Hoffman, in his first Book on Waters, Page 51, says: "That the "Mineral Waters likewise operate through

"their moist and volatile Contents; for they destroy by Alteration all sharp Humours

" of the Juices and Fluids wherewith they

" readily mix, and by this Means dilute and diffolve those that are thick and fizy, and

" bring them into Motion again; and these

"Waters are fo much more serviceable, the lighter and softer they are in their Nature;

" in particular, the Spirit, that these Waters

" contain, does very great Service; for it irri-

tates and invigorates the Blood, as foon as

" united

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"united therewith; promotes the Circulation, and penetrates through the most minute Blood-Vessels, establishing the most
natural Degree of Circulation, as by drinking these Waters may easily be discovered;
for the Motion of the Pulse or Arteries increases, the whole Body perceives a more
than usual Warmth, and a gentle Sweat
appears: All evacuating or cleansing Faculties of the human Fabric perform their

Offices in such a mild and generous Man-

" ner, that the Appetite is not thereby de-"froyed, nor the Conflitution in any Man-

" ner weakened."

Dr. Hoffman also attributes great Virtues to the Alkaline Salts, which he fancied these Waters contain, particularly in absorbing Acidities, diluting the viscid Blood, and carrying off the morbid Mucus out of the Inteftines: But there are other Contents in these Waters, that have a juster Right to vindicate these Properties than these supposed Alkalis; nor is he himself far from confessing it, where he fays, that the neutral Salts of these Waters have the fame Medicinal Power and Virtue, as the Alkalis he imagines therein. Then he proceeds to the fine fubtile Iron-Vitriol. which these Waters, according to his Opinion, also contain, of which he fays thus: " In Regard to the fubtile Iron-Vitriol, which " these Waters are likewise possessed of, they " have a strengthening, mild, attracting Qua-85 lity, by which Means they strengthen weak

" Limbs, particularly the Viscera, and re" store them to their natural State again."

Then he adduces Inflances of the great Services, he has observed done by these Waters in Bloody Fluxes, and that the Vitriol is so mild and gentle, as to cause a natural easy Cohesion. But I am afraid, that, if there was really any Vitriol in these Waters, he would not, in all Probability, have had Reason to praise them so much: But it is however certain, that the good Effects he attributes to the Vitriol, are owing to the Vitrioline Acid, which these Waters contain, and not to Vitriol itself.

Then he proceeds to the terrestrious or earthy Parts of these Waters, of which he says, "That they destroy the Acidities and "sharp acrid Humours in the Blood, and that the same operate in this Respect, as another Alkaline absorbent Earth."

Thus far the Opinions of others; and now

I will proceed to my own.

It must be confessed, that the Spagirical Writers, particularly the Alchemists, have furnished us with Discoveries of the elementary Parts, and the Contents of the Solids and Fluids of the Animal Bodies, which occurred to them, in their Chace after the Philosopher's Mercury, in the Animal Kingdom; their Eagerness after which made them search and examine the Subjects with the utmost Care and Exactness, so as not to leave one Part either solid or sluid in the whole Animal Empire untortured, in the Prosecution of their darling

darling ideal Prize, the Hermetic Mercury: From which, however, we have incidentally received the Advantage of learning the component Parts of which both Solids and Fluids confift; and, by this Means, we have been taught and enabled to extract and produce a malleable Iron out of all Animal Parts, as Blood, Fibres, Flesh, &c. and even the very Excrements are not exempted: But, though the Process is well known, yet for the Sake of those, who are not conversant with Chemical Studies, I shall here, per saltum, infert it, viz.

"The Animal Matter, from which we intend to make by Art an Iron, is first gently dried till all the Phlegm or Moisture

" is separated or exhaled; and then it is to

" be reverberated to Ashes, which are to be

" washed methodically, when it will always appear that Parts of these Ashes are of a

" yellow, reddish Colour, inclining to brown,

" and specifically heavier than those that appear of a whitish Grey, and will generally

" yield to the Attraction of the Magnet;

" these heavy and yellow reddish-brown

" Parts are to be separated from the other

" Ashes, and then mixed with the Fat or

" Suet of the fame Animal, and in a Cru-

" cible put into a Smelting-Furnace, when

" it will as eafily, and in the same Space of

"Time, by a quick, strong Fire, produce a

" malleable Iron, as from the natural Ore

" itself."

Hence it is manifest, that the Animal Elements are cohered and folidated with Iron-Earth; at least, this Conclusion seems to rest affured on the Experiment before-mentioned; for, undoubtedly, the Animal Solids confift of what we extract out of them: And this Iron can even be extracted out of the Matter that goes to the Composition or Renewal of these Solids: For the all-wise Creator has so bountifully and providentially disposed this Mineral, that even all Vegetables partake thereof, fo that not any one Animal can take in any Food, without swallowing a Dose of Iron-Earth, at the same Time; which is incontestably defigned by eternal and admirable Wisdom, to compose, nurse, and preserve the Solids of the Animal Fabric, by the constant Apposition of fresh Particles, as fast as others are worn out by the Action of Life.

There is another Argument, which confirms me strongly in my Sentiments, that the divine Creator purposely adapted the Iron-Earth to bestow that Firmness and Stability to the Animal Elements, necessary to produce and constitute Solids, which I derive from the immediate Effect we perceive upon the Fibres, and indeed the whole Animal Machine from artificial Iron-Medicines, and Chalybeat Waters; fince Nothing is quicker in pervading the Animal Fabric, than what participates of Iron, and there is Nothing in the whole Materia Mediea; that can well promote a Cohesion, unless it is related to this Mineral. Many more Arguments I could produce

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produce in Favour of these Conclusions, but that they must be unnecessary to enforce a Point already so sufficiently demonstrated.

All the Food we eat, without the Seasoning of Salt, tastes not only insipid, but, independent of the Nausea, our Stomach can neither well digest, nor the fluid Juices obtain the requisite Nutriment for preserving the natural Faculties of our Body, without this Salt, which is therefore with great Propriety called the Seasoning of the Earth. Therefore Salt is not only an esculent, but an indispensable Medicament and Corrector of our Food; particularly with Respect to those Parts that constitute the Solids. And indeed, most Animals have a Kind of Medicinal Instinct towards Salt: Thus, Who may not have feen in Sheep, Pigeons, and Horned-Cattle, a joyful Appetency of Salt, when presented to them? Now, as Iron-Earth is found by Experience, when by itself, without a fufficient Corrective, to be prejudicial to the Humidity of the Animal Fabric, if used unmethodically, as it almost callefies the Solids, and is therefore very juftly held too adstringent; for this Reason, the ablest Gentlemen of the Profession always used it with the greatest Caution imaginable; and we should undoubtedly incur a proportionate Inconvenience from our daily Food, were it not for the Salts we correct it with, and thereby guard the Contents that compose the Solids. By the same Rule, Salt is required in Chalybeat Waters; and, if they do

not naturally contain a fufficient Quantity, we must have Recourse to a Supplement of them, by joining with them a due Proportion of those bitter purging Salts, which, in good Practice, are commonly taken with them.

It is manifest that all Acids come from one original Cause, which is the Acid of Vitriol: and that owes its Birth or Generation to Iron-Earth, its appropriate Matrix. Now it is evident, that the Chalybeat Waters, and particularly their earthy Contents, abforb the Acids in all Parts of the Body: Yet it is nevertheless true, that these Waters themselves contain an Acid; and it would therefore feem a Contradiction, necessary to be reconciled, how an absorbent Power should exist in these Chalybeat Contents, when they themselves contain that which we expect they should remove. But this will appear confistent with Reason, when we consider, that these Chalybeat Waters contain only a volatile Acid, and that to no greater Degree however, than to rarify and divide the Chalybeat Principles into the most minute Atoms: So that, when these Contents have entered the Animal Juices, the Acid is exhaled by Perspiration, and the Iron-Earth thus deferted of its Acid certainly attracts the Acids, wherever it meets them; which is thus confirmed by Dr. Hoffman:

"The earthy Parts of the Mineral Waters destroy the Acidity and sharp acrid

"Humours of the Blood, and operate in this Respect as other Alkaline absorbent Earths;

" Respect, as other Alkaline absorbent Earths; " for

for when they have attracted, and are united with the Acid and acrid Juices,

"they have then changed their Nature, and have contracted an afringent Quality which

" have contracted an aftringent Quality, which cannot however do any Prejudice; for, as

" Liquids constantly follow, they cannot oc-

" cafion Obstructions, but are Strengtheners, and preserve the necessary Tone, Vigour,

" and Elasticity to the Animal Parts and

" Functions."

Fixed Acids, indeed, would certainly be noxious, if they existed in our present Subject; but they are not to be found in any Chalybeat Waters, that are fit for Medicinal Use. But those that contain a fixed Acid may properly be called Vitriolic, for they will always adhere so close to the Mineral Contents, as, upon Exhalation, to yield a perfect Vitriol; and fuch Waters are from and at all Times condemned and reprobated in the wholesome Practice of Physic; fince it is these very identical Acids, that are inclinable to make the Animal Elements to cohere. Undoubtedly, the Roman Soldiers invigorated and recruited their Strength by their Posca, which they used in their Campaigns, for their common Beverage in hot Countries, which was Nothing but Water and Vinegar. The German Soldiers use this Liquor frequently, in the Wars of Hungary; and by its cohering adstringent Effect, it is a good Preservative to them against that wonderfully relaxing Distemper, called the Hungarian Disease; that, in so disfolving a Manner, attacks the nervous System,

that the Fibres of fuch as languish under this Distemper, are near reduced to a perfect Mucus. And doubtless, it is from the like Experience of its Benefit, that the Stagefighters of this Metropolis, as foon as they are wounded or tired, drink a Draught of Vinegar to recruit their Strength; for the Moisture which exhales from their Blood would foften the Tendons, as the Steam of warm Water foftens Bones: So that they would prefently lose their Strength, if they did not check the exhaling Moisture, by the cohering Quality of the Vinegar: Hence may be concluded, that if the Chalybeat Waters contained a fixed Acid, they would cohere too much, and almost callify the Solids.

Notwithstanding, the fixed Acids are pernicious Conjuncts with ferrugineous Medicines, yet, the volatile ones are not only not prejudicial thereto, but even necessary to be combined with them: For, as they pass through the Animal Fabric quicker and freer than the volatile Alkalis, they in Course not only open the Passages for the Iron-Earth into the most minute Veffels and Circulatories of the Blood; but also, by the stimulating Quality of the Acid, cleanse and fitly dispose the Elements for a due Reception of these cohering and solidating Mineral Contents: An effential Diftinction, which Practitioners in Physic should never lose Sight of, fince Experience of late hath fully authenticated its Truth and Justness; in that, all the Preparations of Iron, fuch as Powders, Salts, Effences, and Tinc-

tures,

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tures, &c. &c. made with fuch volatile Acids as are obtained from common Salt, have performed fuch Wonders in Distempers, where Iron-Medicines are falutary, as were never yet matched by the Effects of those prepared to the ancient Standard, with fixed Acids.

Dr. Van Swieten, that justly celebrated Commentator of Dr. Boerhaave, affords so strong a Corroboration of the Excellence of Mineral Waters, in the Diseases of a weak and lax Fibre, which insest chiefly the inactive, the sedentary, and indolent Part of Mankind, and is constitutional to the fair Sex; that I cannot, with Justice to my Subject, omit so authoritative a Citation. In his Commentaries on Sect. 28. of Dr. Boerhaave's Aphorisms, he says as follows:

"Among the Acid auftere Fossils, Steel dissolved in a fermented vegetable Acid is preferable to all others, by Means whereof

" fuch Perfons, as labour under a cold weak

"tumid Habit of Body, shall recover even to a Miracle. It causes no Evacuation of

"the distending Liquid, but adds new Strength

" to the folid Veffels, where by being more

" contracted, they drive forward the almost fragnating Fluids; whereas, were we to

" attempt the Cure of these Diseases by Eva-

" cuations, we should only increase the Weak-

" nefs.

"From the Use of these Preparations, an agreeable Warmth is found to diffuse itself through every Part of the Body; the bloated ed Parts subside; the Paleness of the Lips

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" and

" and Cheeks is changed into a florid fanguine Complexion: The Dullness, Indo-

" lence, and Difficulty of breathing upon e-" very the least Motion cease; the former

" Activity returns, all the Functions are pro-

" perly discharged, and Life is in a Manner renewed.

"The SAME Effect is produced by the "Steel diffolved in the medicated (Medicinal)

" Spane-Waters."

Now here, Dr. Van Swieten is only blameable in the Degree of Prevalence, he ascribes to these Chalybeat Waters, in saying no more than that they have the same Effect, as an artificial Preparation of Steel; whereas he should have given them immensely the Preference; and this I shall prove clearly from his own Writings, without torturing or straining his Meaning.

Section 28, he observes, "That the pre-"pared Medicines act first on the prima Via,

" and cannot enter the Mouths of the Lac-

"teals, till they are greatly diluted, and fo infinuate themselves by Stealth, as it were,

"into the Blood: For this Reason, they can-

" into the Blood: For this Reason, they cannot arrive at the last Stage of Circulation,

" but with their Powers very much dimi-

" nished."

He goes on afterwards to affert, that "Steel diffolved in the milder Acids is commonly

" preferred to all others; because it acts not

" only by its auftere, aftringent Virtue, but " because by the wonderous Stimulus of its

" metallie

DICE.

" metallic Sulphur, which is fo friendly to ur Nature, it raifes the vital Powers."

To me, then, it is furprizing, that, reasoning from his own Principles, he did not more strongly perceive, and of Course, inculcate the Chalybeat Waters, as the very Vehicle which Nature has made so preserable to all the Compositions of the Dispensatory, to answer the Purpose of conveying that Steel, he so highly and justly recommends, through the whole Animal Fabric; diluted to his Hand, accompanied by the friendly and even necessary Acid, and urged by their exquisite spirituous Principle, from its elastic, volatile, expansive Nature, through Vessels small beyond Imagination, which they at once de-obstruct, strengthen, and restore.

Farther, in his Commentaries on Section the 66th, where the Cure of spontaneous Diseases from an Acid Humour is treated of: Dr. Boerbaave having proposed towards their Cure, Medicines that abforb, dilute, blunt and change Acids. Dr. Van Swieten, on the Head of diluting Medicines, observes, that they are those, in which "Water, and every " other Liquor, in which Water is the pre-" vailing Ingredient. Oil of Vitriol burns " every Part of the Body that it touches; " and yet, if diluted with a great Quantity " of Water, it shall do no Hurt. But, as an " Acid commonly prevails in weak Bodies, " and watery Diluents tend to make them " weaker, and Weakness has been affigned " as one Cause of producing an Acid in the

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"Body, the absorbent Medicines, for this

"Reason, are to be preferred to the Di-

" luent."

Here it appears very plainly, that the great Objection to watery Diluents is, that they weaken. But, in the Use of Chalybeat Waters, this Objection is cleary removed by the known Efficacy of the Irony Principles; fo that you have here a natural Medicine, which, from the tried Properties of its Contents, not only at once dilutes and strengthens, but acts as a powerful Absorbent and Alterative of the radical Cause of Complaint; that Acid, which if not the universal Cause of Distempers in human Bodies, as has been by fome advanced, is at least one of the most common Origins of them, Whilst, at the same Time, the Operation is highly benign and gentle : " Friendly to bu-" man Nature, and raises the vital Powers."

As to the fair Sex, the Use of the Chalybeat Waters, and their Benefits, may be easily collected from their Propriety in a lax, languid Habit of Body, to which they are so

often subject.

It is then, in these Waters, methodically and judiciously prescribed, that the pale, weakly, languid Girl, whose Blood and stagnating Fluids have given her a yellow or greenish Colour, and whose slagging lax Texture of the Solids has put her out of Frame and Order; in these Medicinal Waters, I say, must she expect chiesly to find a true and natural Cosmetic, when the recovered Firmness of Flesh, and the true Colour of the Blood,

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Blood, shall restore her to a State of Health and Beauty: The Lips and Cheeks will resume their agreeable Incarnate, and the whole Body its healthy Hue and Consistence; exhibiting the pure genuine Charms of Nature, inimitable by all the inconsistent and uncompleat Imitations of Art: As what can be more staringly absurd than the comparatively dull, red and white Fucus unnaturally plaistered over a slaccid, washy System of Muscles; such as some superficial Women vainly imagine they can impose on the Evidence of the Senses by; whilst they neglect the Aids of Medicines, that might perhaps really restore to them their lost natural Privileges of plea-

fing.

Both the Animal Fluids and Solids partake of the Phlogiston, or inflammable Principle, as also the Chalybeat Waters; which Affertion is manifested by Electricity, whereby we can elicit Fire from any Water; it is then to our Purpose to consider, Whether the Phlogiston in the Mineral Waters has any Influence or Connexion with their Medicinal Power and Actions on the human Body. But as we swallow more Phlogiston in two Ounces of Bread, than a Gallon of Chalybeat Water can possibly contain; I apprehend, that this inflammable Principle is chiefly the neceffary Companion of the Mineral Damps, and that those Vapours cannot exist without it; fo that it only affifts to preferve the Texture of this our aquatic Mineral Concrete. and that this small Quantity does not deserve

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to be confidered as of any Account in the Medicinal active Parts of it: Yet, it is probable, it may in a flight Degree connaturally invigorate the Animal Fire or Spirits, and thus contribute to refresh the Vitals.

That there are many different Sorts of Damps and Vapours in the Bowels of the Earth, is of incontestable Certainty: For the Fossil-Coals contain a Damp, that is quite different from those we meet with in Metals, or other Minerals. They are too fo gross, dense, and terrestrious, as to be easily gathered and preservable in Bladders and Glasses, which those of Metals and Minerals are not, being of a finer, and more rarified Nature: Those of Coals, therefore, are of a more suffocating Quality; so that they are capable of overpowering the vital Spirits, and proving immediately mortal to those that approach them too near: And thus we fo frequently hear of Coal-Miners being suffocated; whereas, on the contrary, the Vapours in Metalline and Mineral Veins are of a more subtile Nature, and occasion lingering Diseases.

It is also indeed remarkable, that the Effluvia of Liquors, fuch as Wine, Beer, &c. when they are in Ferment, are of a Mineral Quality, and will prove certain Death to any Animal whatfoever, that should be confined in a close Cellar, within their Sphere of Activity, whilst the Liquors are in Fermentation. Nor should it escape Observation, that the pernicious Charcoal Damps have ever a Smell

exactly like that of Arsenic.

But all those Damps, that are contained in the Mineral Waters, are rarified and corrected by the Phlogiston, and the Acid Contents, which are fo powerful in fubduing heterogeneous Qualities, that even the poisonous Arsenic cannot refist these overbearing Correctors: Since it is very well known, that Arsenic, by the Help of Brimstone only (which is nothing else but Phlogiston and Acid) may be changed into a most falutary Medicine, that retains none of those pernicious, deleterious Qualities, the Arsenic is infamous for. But the Damps, wherewith the Mineral Waters are impregnated, are certainly the most mild and homogeneous to the human Constitution; so that even were they not corrected by the Phlogiston and Acid (which, however, they always are) I should not think them in any confiderable Degree heterogeneous to the Animal Fabric, unless they were received in too great a Quantity; for, then, undoubtedly they would over-power the Vitals, and prove certain Death. This, however, is no more a Danger, than what an Excess of Quantity will make all Cordials, Wine, or any Medicine whatever, liable to bring with them.

But, undoubtedly, these Damps, though of a Mineral Nature, have some Affinity with our Animal Spirits; insomuch, that it is almost instantaneously perceptible many Ways, after drinking them; even, insomuch, that they intoxicate such as are of a weak Constitution, or, at least, to all Drinkers induce a

Drowfiness,

Drowfinefs, or Inclination to fleep, upon which however a Brifkness of the Vitals enfues. Those who complain of restless Nights, and for Want of their natural Repose, are constantly in a fretting, melancholic, unlively Condition; but as soon as they drink these Waters methodically, they not only procure themselves a sound natural Sleep at Night, but wake in the Morning, salutarily refreshed with a surprizing Vivacity and Strength: So that I cannot help thinking, that the Damps in the Mineral Waters restore, at least, the vital Spirits to their natural Functions, when clogged and suppressed in slimy, sizy Juices.

Dr. Hoffman tells us, not without great Weight of Reason and Truth, that common Water approaches the Idea we have of an universal Remedy. Dr. Shaw, who has translated his Treatise on Mineral Waters, will permit me to quote his Translation (as I should not be able to furnish a better one) of that Part, where he treats of Water, as an uni-

versal Remedy, Page 157.

"We affert, that Water is a Remedy fuited to all Persons, and all Times; that there is no better Preservative from Distempers; that it is affuredly serviceable both in acute and chronic Diseases; and lastly, that its Use answers to all Indications, both of Preservation and of Cure."

From what has been faid then, I apprehend we may fafely conclude; that, in general, the Medicinal Power of the Mineral Waters confifts in the following Contents:

Ist,

Ift, In the Iron-Earth. 2dly, In the Mineral Damps. (N. B.) In the Division of the latter End of the first Chapter, I have comprehended them under the Head of Phlogiston, or Principium inflammabile. And, 3dly, In the common Water,

The neutral Salts, Phlogiston, and volatile Vitrioline Acids are the Correctors of the whole Concrete.

To the Water and Iron-Earth it is owing, that by Experience two opposite Qualities in the Chalybeat Waters are observed, viz. the Suppression of the Menses, when too violent; and the Promotion of the same, when obstructed or totally suppressed; for which, I apprehend however, we may thus conciliatingly account.

In the first Case, of an Excess of the Flux, the Blood-Veffels are weak and lax, the Fluids are corrupted; fo that the Solids are deprived of that Support, which they constantly want, and the Chyle, for Want of a due Concoction, turns into a watery Substance, too thin for the Animal Faculties to execute their Functions, which thin Matter discharges itself with the Menses like a Flood. Now, the Iron-Earth in this Condition not only corrects the Fluids, but also restores the Tone of the injured Vessels, by which Means the Circulation is restored, upon which the Organs depend for performing their Part; whilft, at the fame Time, the Water impregnated with

with the Mineral Damps corrects the corrupt Juices, and disperses them either by Perspiration, or other natural Evacuations: And thus the Whole is restored into the natural

State again.

In the fecond Case, of obstructed or suppressed Menses, this different Effect may well be accounted for, flowing from the same Cause as in the first, weak Vessels and vitiated Fluids; for, could the Organs but perform their Office, the Blood would not turn thick and fizy (which makes the Difference from the thin Chyle in the first Case) so as to occafion Obstructions: Now I apprehend, that in these Circumstances the Iron-Earth performs its Medicinal Office, in correcting the Fluids, and strengthening the lax Vessels, whilst the Water dilutes the fizy flimy Bood, and penetrates in Virtue of its Mineral Damps thro' the most minute Passages of the Circulation: So that these Extremes are likewise reduced and brought back to that falutary Medium, in which Health confifts.

Very eminent Gentlemen of the Faculty fuggest, that Mineral Waters are beneficial in all Constitutions, and in all Ages; but this, I apprehend, admits of a Restriction: For, if they would please to consider, that the longer we live, the sewer Blood-Vessels we retain in our Bodies, those innumerable small Canals diminishing gradually, and are at length almost totally lost; then the Moisture of the Animal Liquids lessens considerably, the larger Vessels in Proportion become cartilaginous, folid, rigid,

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rigid, and callous: Now, in the Case of a Vergency towards such a Habit, I leave any one to imagine, whether Concretes of the Nature of Mineral Waters, that dispose by their native, inherent Astringency and drying Quality, the elementary Particles to Cohesion, if taken into a Body thus already too much disposed to it, would not hurry Life to its final Period, or at least accelerate it.

The learned Dr. Schutte therefore, who deferves the most to be credited, from his extensive Study and Conversancy for many Years, in these Waters; after having, with that Candour and judicious Accuracy, which do so much Honour to Hippocrates, enumerated as well their good as bad Qualities, entirely and very justly forbids to those, who are past 60,

the Use of the Chalybeat Waters.

Then, in Regard to the Pretention of their being ferviceable in all Constitutions, this is likewise to be cautioned against: For it is very well known how prejudicial they are to fanguine, or as they are otherwise distinguished, hot, or adust Constitutions; so that it would be fuperfluous to enter on a Refutation of this Affertion here: But, if these pre-mentioned Advocates for the universal Propriety of Medicinal Waters, mean the simple, pure, light Waters, fuch as those of Holywell, &c. &c. though they contain no Mineral Ingredients, and abound only in Air, and a fubtile, æthereal Spirit, fuch as I have before on that Head treated of, I readily subscribe to their Opinion; for I hold them not only curative of many chronical

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chronical Diforders, fuch as the Gout, Rheumatifm, Stone, fcorbutic Foulnesses of the Blood, schirrous Tumours, and Languors of the Limbs; but good Emmenagogues, and indeed, safe and salutary Medicines, internally or externally applied, in all Constitutions and

Ages of human Life.

The fofter also the Mineral Waters are. the more falutary Effects they produce. And. upon this Account, the learned Dr. Schutte has observed a more sovereign Efficacy in the Mineral Waters of Cleves, than in any other known Chalybeats, owing to their remarkable fuperior Lightness and Softness: For as I have already mentioned, the Waters of Cleves pass through a natural Filtrum, and the best in its Kind; by which Means, they are rendered benign, mild, and friendly to all the natural fluid Juices: Therefore they unite fooner with the Blood, and readier, and eafier fecrete themfelves from it by Urine, whereby the Circulation is in every Respect, and in the most falutary Manner, facilitated.

Dr. Schutte, who cannot be too often quoted on a Subject, in which his Opinions have the Weight of Decifions, has also observed, that these Waters of Cleves are eminently efficacious in consumptive Cases, in which he frequently prescribes them with Milk, wherewith they perfectly agree and operate with

furprizing Success.

CHAP.

CHAP. X.

Rules and Directions for the Use of the Chalybeat Waters, especially those of CLEVES.

A S I have, in the preceding Chapter, in my Description of the Properties and Virtues of the Chalybeat Waters, taken those of Cleves for a Standard: I shall, in the same Manner, apply the Rules to be observed in their Use more immediately to those Waters; so however, that they may easily be abstracted and generalized.

I apprehend that proper Rules or Directions for those, that intend to enter on a Course of the Chalybeat Waters, will be the more necessary, as the Resort to them is generally preceded by the Fatigues of a Journey, more or less, according to the Distance of Residence. All Circumstances, then, should be duly weighed, and every previous Caution be used, before they are attempted.

In Order then to ascertain the Benefits to be expected from, or the Dangers to be guarded against, of their Use and Abuse: I shall here endeavour to put the Patients into a right Road and Method, by the following Observations and Directions, which for the greater Clearness and Explicitness, I shall divide into

these Sections.

Sect. I. What is proper to observe before a Course of Drinking the CHALY-

256 Directions for the Use CHAP. X. BEAT WATERS is entered upon, and what Preparations ought to precede it.

Sect. II. The Rules necessary to be attended to, during the Course of

Drinking these Waters.

Sect. III. How to manage after the Course of Drinking is compleated or left off.

Sect. IV. Considerations on the Distempers or Revolutions of the Animal System, that incidentally arise in the Course of Drinking these Waters.

Sect. V. Of the Effects that sometimes ensue the Course of these Waters, after the same is compleated or left off.

Sect. VI. How the Patients are to preparetheir Bodies for Bathing; the proper Times of Bathing; the Term for continuing in the Bath; the Manner of Bathing, and Directions therein.

Sect. VII. Of Accidents that sometimes intervene in the Bathing; preventive Advice against any bad Consequences attending the Bath; with Cautions against the Abuses of improper Bathing. And,

Sect. VIII. Rules necessary to be obser-

ved after Bathing.

Sect.

Sect. I. What is proper to observe before a Course of drinking the Chalybeat Waters.

The Patient must previously have the Approbation of a Physician, that is both acquainted with his Constitution, and the Nature and Properties of these Waters; unless he is fenfible, that his Diforder is the simple one of a lax System of the Fibres, that original Cause of numerous and dangerous chronical Diforders, and that a Cohesion of Elements is wanted, towards restoring or bringing it to its proper Crass, or Firmness; in such Circumstances, I apprehend, he may proceed. without Hesitation, upon his own Judgment.

It is next requifite, that the Patient should take with him an historical Account, from his constant Physician, of the Nature of his Distemper, the Cause, Beginning, Changes that have happened; what Remedies have been applied, and what Effects they produced. This Account the Patient should deliver to the Physician, attending on the Spot, at the Mineral Waters; and withal relate to him, as distinctly as possible, what he himself thinks, knows, believes, or has felt of his own Diforder; fo that the Physician may be enabled to collect or frame, out of the whole, the truest Idea or Diagnostic of the Case, and thereon advise the best Manner of appropriating the Waters, to answer the most falutary Ends: For all this distinct Informa-

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tion is the more necessary, as that all chronical Diseases are commonly complicated with other Distempers, which will in their Course put on various Aspects, and incur various Changes from Time to Time; all which the Prescription of these Waters must have spe-

cial Regard and Adjustment to.

When these Preliminaries are settled, the Patient must prepare himself for opening his Course of Drinking, which is to be done various Ways, agreeable to the Constitution and Distemper of the Patient. For Instance, a Person that is naturally rich in Blood, accustomed to a high Diet, and a fedentary, unexercifed Life, should be blooded ten or fourteen Days, before he attempts the Waters, and that plentifully; in Order to make Place for a better Circulation. But I strongly caution here, against Bleeding but two or three Days before the Drinking, for Fear it should occasion Struggles in Nature, hard to be overcome; unless some particular Necessity requires Bleeding fo near, or with the Water-Drinking, and then only small Quantities of Blood should be taken.

The Taking a Purge, before entering on the Course of Drinking, is universally necessary to all Patients; and it is ever better to do it at the Place of Resort, where the Use of the Mineral Waters is intended, about two or three Days after their Arrival, when they are cooled and refreshed from the Fatigue of their Journey; for, as Over-heating the Blood is a common Consequence of Journies, Physic ought

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ought not to be taken immediately upon it, or till a proper Composure is restored to the

Animal System and Spirits.

It is highly necessary, that the Physic be specifically appropriated to both the Disease and Constitution of the Patient. Some Constitutions, for Example, have their Juices over-proportioned to the Solids, others underproportioned; fome abound in thick, fizy, gross Juices, which require in Course to be prepared and predifposed for a Discharge, which there is no Occasion for, when the Juices are thin or faltish. But particular Regard should be had, that the Physic be not too ftrong, that the Tone of the Stomach and Intestines be not weakened thereby, nor the Crasis of the Humours too much agitated or diffurbed. Nor must there, by any Means, be shewn an Inattention to the Distinctions of Physic, according to the different Constitutions; for Example, the bitter purging Salts are improper for those whose Juices abound in Acids. The Scammony is detrimental to the Weak. The Aloe difagrees with those that are of a sanguine, hot, dry Nature, and inclinable to Bloody Fluxes. Neutral Salts are pernicious to weak and phlegmatic Intestines. The Sena is not safe for those that are apt to have the Cholic, and Pains in the Bowels. Rhubarb is hurtful to fuch as are subject to Giddinesses in the Head, and so vice versa. Therefore it is always the fafest and surest Practice to prescribe such Physic, as is indicated by an exact Diag260 Directions for the Use CHAP. X. Diagnosis of the Constitution and Distemper; and, the Day after the Purge is taken, the Course of drinking the Waters should commence.

Sect. II. The Rules necessary to be attended to, during the Course of drinking these Waters.

Under this Head, falls first under Consideration the Time of the Year, or proper Season for drinking these Waters; though I am of Opinion, that the Use of them may be recommended at any Time of the Year, as I have hinted in the third Chapter, on the Waters at Tunbridge in Kent; as conceiving them constantly beneficial, especially to those in a fedentary Station of Life. But, generally speaking, I apprehend the most particular and proper Season for drinking them, to be from the Middle of May to the latter End of September, in the Meridians of Germany and England; that being the fittest Time to go to Work with those chronical Disorders, that chiefly exist in the Complications of many Diseases; for it is in this Time of the Year, that the Animal Fluids are more disposed for a Change or Alteration: But however, where Necessity evidently remonstrates against a Delay, I would not have a Person stay for any Confideration of the Season, but to make Use of them at any Time of the Year; fince, at all Seasons, they may perhaps be less beneficial indeed, but still beneficial.

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As to the Time of the Day, the Morning is undoubtedly the properest Time for drinking these Waters, and that from Five to Seven of the Clock, according as the Weather will permit, in Point of Warmth or Cold; but I would, on no Account, have any one begin his Draught in the Summer, after Seven at farthest.

The Coming or Repairing to the Well should be effected with all possible Ease, either in a Coach, on Horse-back, or Walking; so as, by no Means, to be heated in getting thither. To those that are able, gentle Walking is in every Respect the best; for the Water not only tastes the more agreeable, but even the Success of the Operation is thereby

greatly forwarded.

The necessary Quantity is next to be confulted: The Patient should begin, on the first Day, with four Glasses, and each Glass to contain no more than one Quarter of a Pint; so that the Quantity on the first Day is not to exceed a Pint, and the succeeding Days two Glasses may be added, and this for eight, ten, twelve, or sixteen Days successively; so as to come to the Number of twenty to thirty-two Glasses a Day. But the specific Quantity should be determined by the Physician at the Wells, who has the Care of the Patient, and will increase his Doses, according as his Constitution will bear it.

For too large, or intemperate a Number of Glasses, is very often more detrimental

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than ferviceable, where an Over-load will weaken, or too much cool the Intestines, whereon a Train of bad Consequences would ensue; and to this Danger are equally liable such as set out with drinking large Quantities at the first, without duly graduating their Advances, from being in too great a Hurry for their Cure, or hoping to shorten their Course of Drinking: But it behoves every Person, who expects a Benefit from these Waters, to proceed with no more Haste, than will ensure them good Speed.

Entering next on the Confideration, how this Water should be drank; I would advise those who are of a robust, hot Constitution, those of a fanguine, choleric Temperament or Disposition, to drink these Waters cold, and swallow them leisurely, as they are taken

out of the Well.

The weak, the lean, the phlegmatic, fuch as are inclined to Melancholy, the Ladies of a tender leuco-phlegmatic Complexion, and all those that, by drinking cold Liquors, are affected with a Pressure upon the Stomach, Hoarfenefs, Coughs, and Shiverings in the Limbs; all these will do well to have the Water filled out in Bottles, or fuch earthen Jugs, as the Selter Water is fent over in, well corked, and just shewn to the Fire, in Order to take off the great Chill, or dipped in warm Water, for the same Purpose; which is frequently obtained by many other Methods; but none, I presume, better than those hereby pointed out. If

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If those that drink these Waters cold, perceive a Weakness or Indisposition of their Stomach, they fhould chaw along with it Coriander-feeds, Carroways, Galangal, Zedoary, Elicampane, Angelica-root, Calamus-root, Orange or Lemon-peels, all of these just pleafingly candied over with Sugar; and any of them may be chosen, which is most agreeable to the Palate, and Nature of the Patient's Disease; or a Mixture of grateful Aromatics into a Sort of Sweet-meat or Confection, peculiarly adapted to the Water-Drinker's Tafte. But, on the whole, Regard must be had to be as fparing of the Sugar as possible, in the Course of drinking the Mineral Waters; for the Sugar is apt to breed many Diforders, fuch as Purple Fevers, &c. when it encounters with the Chalybeat Contents, in the Animal Fluids.

From eight to fixteen Days proceed, increasing the Number of Glasses; and from four to ten Days, or longer, if the Circumstances require it, continue drinking the highest Number of the Glasses; after which, the Patient must decrease daily his Number, in the like gradual Proportions as he increased them; continuing thus till he comes down to the Number he began from: And thus, by easy Degrees, disengage Nature from the Water again.

These Waters should never be used without gentle Exercise. Those, for Instance, that are able to come to the Head of the Well, should, between each Glass, take an easy a-

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greeable

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greeable Walk. And as to those, that are not able to come themselves, but are obliged to fend for the Water into their Chambers; it is necessary to contrive such Exercise within Doors, as their Constitution can comport with: For, by Means of easy Exercise, the Water readier unites with the fluid Juices, paffes through the Blood, and discharges itself by Urine.

We have next to confider, how long the Course of drinking the Mineral Waters is proper to be continued; which must be determined from the Constitution of the Patient, and the Nature of the Diftemper: For those that drink them as a Preservative, a Course of fourteen Days is a fufficient Time. In flight fimple Diftempers, three Weeks is commonly long enough; but complicated chronical Diforders will, at least, require five or fix Weeks, and fometimes more; especially where the Animal Juices are thick, fizy, or acrid; and, agreeable to these Circumstances, the Course of drinking these Waters must, in Point of Duration, be directed and afcertained.

It is very beneficial also, in chronical Diforders, to use proper Medicines, at the same Time, with a Course of Chalybeat Waters. Some, indeed, there are of the Gentlemen of the Faculty, who strenuously oppose these collateral Aids, and are absolutely for leaving the Mineral Waters to work a Cure, unaffifted by other Phyfical Remedies; but the best and most approved Practice, ancient and

modern,

modern, fuggest the contrary: And indeed, Dr. Schutte at Cleves, and Dr. Scipius Physician at Pyrmont, deserve the most to be credited on this Head; as these two Gentlemen have had a more continued and extensive Practice in the Chalybeat Waters, than any two that any Age can boast of; and they firmly and positively affirm and attest their Observation of many fignal and salutary Effects to have taken Place in chronical Disorders, when proper Medicines have been used, to second the Efficacy of Mineral Waters.

The Diet, or proper Regimen, demands an Observation of certain Restrictions and Rules, by whoever hopes for any Benefit from a Course of these Waters: For it is on a suitable Diet, that chiefly depends the Success of their Operation, as an improper one will rather occasion or super-induce fresh and innumerable Disorders: For it is a general Law to the Sick, that, whatever Remedies they may betake themselves to, they must indispensably govern their Diet, so as respectively to savour and second their Effects.

In Regard to the Regimen, then, it is required, that the Non-naturals be strictly attended to. (1.) The Air, or Atmosphere, we breathe in. (2.) Eating and Drinking. (3.) Exercise and Rest. (4.) Sleeping and Waking. (5.) The necessary Evacuations. (6.) The Passions of the Mind. And, in any of these Points, Errors must be carefully avoided.

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First the Air. A serene, warm, clear Air is certainly the best: The Glare of the Sun and the Beat of its Beams should be studioufly avoided. Pleafing Fresco's, agreeable Shades, under Trees, Vifta's, &c. with the gentle Motion of Walking, exercife both Body and Mind. But, when the Air is intemperate, inclement, as cold, foggy, rainy, or the like; it is best for the weak, and tender of Constitution to keep within Doors, in a Room temperately warm, or drink the Waters before a Fire. But if it is not too cold indeed, those of a stronger Constitution should seek for a due Degree of Warmth in their Cloathing, and not refrain from repairing to the Fountain-Head, where the Waters are ever drank to most Advantage.

2dly, Eating and Drinking. In thefe Points, Regard thould be constantly had to the two following Rules: First, never to eat too much at a Time. Secondly, that the Aliments be good and nourishing. Neither do I here enjoin to fuch, as expect to reap a Benefit from a Course of Mineral Waters, too strict an Abstinence: That Patient will have the best Chance, who observes the golden falutary Medium. He should rise with an Appetite from Dinner and Supper; yet, at the same Time, not take less Food than the Conftitution requires, or chearfully bears the Load of. The Supper should never be taken later than Six or Seven in the Evening. Meat Suppers are never innocent, and therefore positively to be renounced. And these Rules

must

must be respected and observed, if the Patient expects good, and not bad Consequences, from his Course of Drinking these Waters; and therefore I apprehend he cannot be too careful of his Duty: For as most Disorders, for which a Cure is sought at their Hand, are owing to gross Juices, and a high pampering Diet, the Cause, whence the Distemper proceeds from, must be laid aside, before any Good can be reasonably hoped for.

For the proper *Foods* and *Liquors*, I refer to the third Chapter, where they are fufficiently and competently pointed out by Dr.

Rouzee, treating of Tunbridge Wells.

3dly, Exercife and Reft. I have already incidentally observed, that the Exercise cannot be too mild and gentle. It is therefore necessary to fit down, and rest a little between the Walking, but yet not so long as to become cold or chilly. Those, indeed, that owe their Complaints to a sedentary Life, where the minute Vessels are obstructed, or where the scorbutic Taint prevails, will do well to promote constant, gentle, breathing Sweats by their Exercise; but, at all Times, have a special Care and Regard, not to catch Cold upon them.

4thly, Sleep and Waking. It is well known, and I have already observed it in the proper Place, that the Mineral Damps affociated with these Waters always make those, who are in a Course of Drinking them, sleepy after Dinner; which Doziness must by no Means be indulged, but utterly avoided, diverted,

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or put off, by any Means of Amusement, consistent with the general Rules of Exercise and Diet. Neither must Sleeping be resorted or yielded to immediately after Supper, which will be much more beneficially crowned with any gentle Exercise, as Walking, or the like. But the properest Time of going to Bed is about Nine or Ten o' Clock at farthest.

5thly, The necessary Evacuations. Under this Head, I must acquaint every Water-Drinker, that he is not proper, unless he has the Benefits of the Stool, two or three Times a Day, and a plentiful Discharge by Urine; and if this is not regular, the Patient must apprize his Phyfician thereof: And here I enter strongly my Protest against the Prescription of Minerals in any Shape, on this Account; but especially Mercurials, which have lately been too much the Fashion, to fuch a Degree, that some Gentlemen of the Faculty have even advised and ordered Mercurial Purges to be administered with Chalvbeat Waters, and even with the Pyrmont Water, to Ladies of the most tender Constitution: But these I would beg Leave to remind, that the Mercurial Contents expand themselves through the whole Animal Machine, as well as the Iron-Earth, and whereever they meet together in this Fabric, they unite on fuch firm Principles of Cohesion, as not to be diffolved again by any Liquid, unless it be Aqua-fortis; and with this we know it cannot be done, fince there cannot be a Quantity poured in, or fent after them,

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to do the Business, without destroying Life. And, by this Manner of Proceeding, many grievous Diftempers have been hatched: For it is indifputably obvious to Sense and Reafon, that where fuch a hard Stone-like Concrete lodges in the human Body, over which the Fluids have no Power, it must greatly endanger the Parts. Those, indeed, who judge superficially, and have not sufficiently examined, by Chemistry, the Analytical Principles of the Materia Medica, as well as of all the Solids and Fluids in the Animal Kingdom, and joined thereto the Lights which Anatomy gives into the human Texture, may perhaps not readily adopt, or receive this my Caveat against this Abuse of Mercurials; but I firmly depend that I shall have every truly learned and candid Professor of the Faculty on my Side.

I could also illustrate this my Affertion with indisputable Instances and Conclusions, but that it would engage me into too long a Digression; but should I ever have Leisure to write a Treatise on the Asthma Montanum, or the Miners Distempers here in England, and the Causes of the Consumption more especially endemial to London; I shall then give a full Elucidation of this Point, when

too it will appear more in its Place.

Yet I would not be understood here, as if I meant to reject, or condemn indiscriminately, the Use of *Mercuries* in the Practice of Physic: On the contrary, I know too well their Efficacy and Value, not to esteem them,

when

270 Directions for the Use CHAP. X. when they are rightly prepared, and judicioully administered in the proper Cases; but there is no exclaiming too much against the Abuse, and empirical Prescriptions of them. we daily fee Instances of. It is not in Nature, they should be indifferently good in every Circumstance and Constitution, or agree with all Things. Then there exists a most crving, pernicious Practice of bad Preparations, or rather Adulterations of the Mercurial Medicines; infomuch, that for my Part, if I am not very well affored that they are genuine, and authentically elaborated, I make no Use of them; but chiefly trust to Cinnabar, Æthiops Mineral, and Mercurius dulcis.

The most suitable Purges with Mineral Waters, or Promoters of the necessary Stools, should be Nothing, but such as are made of Vegetables or Salts, but both properly adapted to the Constitution and Distemper of the

Patient.

6thly, The Passions. A Mind easy, serene and composed, is a Disposition highly necessary; and without which the rest is of no Avail. It is therefore absolutely required of those, that enter into a Course of Chalybeat Waters, that they should leave all Pressure of Concerns, public or private, at Home. No Fear, Grief, Thoughtfulness, or Meditations should engross the Mind; but a constant Disposition to Chearfulness be aimed at, and cultivated by all the innocent Amusements and Diversions sit to inspire Mirth, and chear the Spirits; so that the Mind unruffled, calm, and tranquil,

of the Chalybeat Waters. 271 tranquil, may leave the Body more at Liberty, and free to receive the Benefits of the Waters.

Sect. III. How to manage, after the Course of Drinking is compleated or left off.

When the Course is thus finished, and the Waters gradually left off; the Patient should, within the Space of ten Days after, take two or three proper Purges, or even more if requifite, at easy Intervals; in Order to carry off any Relicks of the Water that may lurk in the Body; which Purges should be taken where the Chalybeat Waters are drank: For it is very improper to travel immediately after giving them over. The same Regimen and Diet should also be continued for some Time after; and if the Patient must resume his old Course, and Habits of Life, he should at least do it gradually, and not abruptly. For gross and fatal is the Error of those, who think that, by a Course of these Waters, the Intestines are so scoured and purified, and the Liver cooled, that they are therefore refitted for any new Debauch whatever; and from thence date a new Commission to replunge into the same Irregularities that occafioned the Complaints, that first fent them to the Waters; and which will infallibly, on fresh Provocation, break out again with fresh Violence. How much happier those, who, having

having been brought on their Resort to these Waters, into a Course of Medicinal temporary Temperance, convert its Institutions into a rational and lasting Rule of Life, and atchieve the inestimable Blessings of Health and long Life, at the Expence of a few senfual Appetites, best kept unhumoured, and once for all subdued!

Sect. IV. Considerations on the Distempers and Revolutions of the Animal System, that incidentally arise in the Course of drinking these Waters.

The most falutary and approved Remedies are feen fometimes to produce Effects very opposite to their Design: Thus, common Cathartics prove oftentimes Emetics, and cause violent Vomitings, fainting Fits, Pains, or Gripings in the Bowels, and fometimes other Symptoms equally distant from their common known Course of Operation. Now, it is clear, that these Perversions are either owing to the Nature of the corrupt Juices of the Body, conflicting with, and over-powering these Medicines where they meet; or to the Regimen or Management of the Patient, in his taking them. It is not therefore at all furprizing, that the Chalybeat Waters should fometimes produce uncommon, untoward, and even Effects opposite to their real Nature; for they act agreeably to the Animal Juices they meet with, or according as the Courfe of the Chalybeat Waters. 273 Course of Drinking is regularly or irregularly conducted.

The Vomiting that is occasioned by these Waters, in the Beginning of drinking them, is very common to those, whose Stomach is full of flimy Matter, or bilious Impurities; therefore Nature endeavours with the Excitation of these Chalybeat Waters, by this short Way, to get rid of these heterogeneous Matters: With Drinkers thus affected, the Vomiting continues for two or three Days, rather with Ease to them gradually composing, tempering, and strengthening the whole Body; but if it should continue longer, and weaken the Patient, then proper Remedies, fuch as Alkaline Salts or Salt-Petre, vegetable Purgatives, or even eafy Vomits, ought to be administered to follow the Hints of Nature, and to relieve the Constitution from these corrupt Juices, as the Caufe from whence the Complaint proceeds.

Costiveness is common to almost all who are in a Course of drinking, but more especially to such as are of a choleric Disposition; the Purging Salts are therefore commonly used with these Waters: But the better Way seems to be, first, to try if two or three Stools a Day cannot be obtained with stewed Raisins, Corinths, Prunes, or a laxative Vegetable Diet; for if, by these Means, the necessary Evacuations may be promoted, they are better gained, than by Medical Cathartics; and the Chalybeat Waters will act in more salutary Concert with them. Some Chalybeat Waters,

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Waters, indeed, especially those of *Cleves*, are so falubrious, as spontaneously to promote these necessary Evacuations; after they have been taken regularly for fix or seven Days.

An Obstruction of the Urine, whilst drinking, is a Case that rarely intervenes; yet there are Instances of it, occasioned by a slimy, fizy, tough Matter, or by Gravel that obstructs the Ureter; or fometimes an irregular Course of drinking will give Rife to fuch Obstructions: When this happens, there must, without Loss of Time or Delay, be applied the Means of Relief. And the best Method, I know of, in these Circumstances, is, to open a Passage with a proper Instrument through the obstructing Matter, for the immediate Discharge of the Urine: Then use the warm Bath a few Times, which, with proper nephritic and diluent Medicines, will foon fubdue this Complaint.

A total Obstruction of all the evacuating Faculties, as Stools, Urine, and Perspiration, is the worst of all Circumstances, that can happen in a Course of drinking these Waters; and if not the Fore-runner of very bad Consequences, is at least a shrewd Indicant, that the Waters will not agree with the Constitution of the Patient: Whenever therefore this Symptom declares itself, the Physician must be instantly acquainted therewith; and, if he cannot, in two or three Days Time, recover to the Patient these indispensable Evacuations; then the best Thing the latter can do, is to leave off the Waters immediately, to take two or

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three Purges, to ease and relieve the Body from any Impressions of the Water taken; and to resort to other Remedies for the Recovery of his Health: Seeing it would be in vain, and even dangerous, to attempt it with Chalybeat Waters.

Flatulencies, Gripes in the Bowels, and Cholics, are owing to the Tunning in this Water all at once, cold into the Stomach; and therefore, in this Case, the Water should not only be drank slightly warmed, as above directed; but corrected also with proper Carminatives or Essences, that destroy and break the Flatulences, and warm the Intestines again: But if these Complaints are owing to Costiveness, then a proper Purge must be given to remove them.

A Burning Pain in the urinary Passage, is frequently occasioned by acrid saline Humours in the Juices; or by an ill-cured Gonorrhæa, which the Chalybeat Waters generally remove: But if it should not abate and give Way to the Use of these Waters, in five or six Days Time; then proper Emulsions and Remedies must be joined to the Water-Course.

Inflammatory Pains and Ulcers, or Eruptions in the Fundament, or Intestinum rectum, happen to some Water-Drinkers; this Complaint is frequently occasioned by the same Cause, as I have before mentioned, viz. acrid saline Juices; or by a sharp Humour from the Bile: And generally, and indeed most commonly ceases on sour or sive Days drink-

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ing these Waters. But, if it should continue longer, then proper Remedies are requisite to

be joined with the Chalybeat Waters.

A Sort of Itching, or Breaking out in the Skin, is common to those who are afflicted with the Scurvy; or where the Blood is full of bilious, acrid, sharp, saline Matter: But this must be borne with Patience, and nothing taken, or applied to, in Order to difcourage or suppress it: For the same is a certain and favourable Indication of the falutary Effect of these Waters, which eliminate and expel the undue Juices, or unnatural Matter, between the Flesh and Skin through the perspirative Pores: And this cutaneous Disorder commonly goes of itself, as soon as the Malignity of those Humours is by this easy Way fufficiently exhausted: But if it should still continue, after the Course is compleated, then a proper Sweat, or Bathing a few Times in the Artificial Chalybeat Baths, will effectually remove it.

Returns of the Pains of past Diseases, the Breaking out, or Opening again of old Ulcers or Sores, or the Return of an Ague, that has been immaturely or improperly suppressed by the Peruvian Bark, during the Course of drinking the Chalybeat Waters; are a certain Sign that these Diseases were never fairly well cured, and that the Seeds of them were left lurking in the Animal Fabric; but, those to whom these Renewals happen, may expect fundamental Relief from the Mineral Waters:

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For they are certain Assurances, that they will

radically remove the Caufe.

The Cramp in the Calf of the Leg, or in any other Part of the Body, is also a favourable Sign of the good Effects of the Waters, however troublesome and inconvenient the Sensation may be for the Time; which too may easily be removed by the Artificial Chalybeat Baths, or by exterior Anointing with proper Oils; amongst which the British Oil may claim the first Place, as undoubtedly the best for this Purpose.

Sect. V. Of the Effects, that sometimes ensue the Course of these Waters; after the same is compleated or left off.

As all Distempers, especially chronical ones, are not only confined to the Juices and Fluids; but are more or less dispersed through, and feated in the Solids; as Nerves, Sinews, Muscles, Membranes, minute capillary Vessels, &c. which continue obstructed, or in various Modes affected with the Relics of peccant Matter. All the Symptoms, therefore, of a perfect Recovery cannot be always expected in the Course of drinking, or immediately after it; and we have very frequent Instances, that a confummate Cure or Recovery of the Malady has not taken Place, till from fix to fourteen Weeks, or longer; after the Waters have been left off, on the Completion of their T 3 Courie.

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Course. It is therefore a necessary Caution to those, that are not immediately relieved by the Chalybeat Waters; to affish their Constitution by a falutary Diet or Regimen, to expect patiently the After-Effects of the Mineral Waters that so frequently answer their Intention; and by no Means to ruin or retard the Operation by an impatient Recourse to other Medicines and Drugs; of which there are so frequent and fatal Misappropriations, both in Quantity and Quality.

Sect. VI. How the Patients are to prepare their Bodies for Bathing; the Time of Bathing; the Term for continuing in the Bath; the Manner of Bathing, and Directions therein.

The best and most requisite Preparation for Bathing, is to purify and cleanse the Body of all unhealthy Juices, or at least as much as can be; which is best, most compleatly and effectually obtained, by a due Course of drinking the Mineral Waters, which will not only correct and expel all unnatural Fluids; but also de-obstruct the minutest Passages; and by this Means the Body becomes perfectly well disposed, and prepared for Bathing.

But if the Case is such, that the Patient cannot, or perhaps is indisposed to undergo a Course of drinking; or that the Bathing alone is required for his Recovery: Then, the pec-

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cant Matter must be discharged by proper Purges, Emetics, or Perspiratives; and the Body thus cleared, and fitted for Bathing. But still I repeat it, it would be far more eligible, and these Baths would, generally speaking, produce more effectual Benefit; if the Patient could precede them, by a Course of drinking from eight to source of drinking from eight to fourteen Days, or longer, as the Circumstances of the Distemper might require, and bathe afterwards.

Such Constitutions, as naturally abound in Blood, and have neglected the usual Bleeding, must be blooded at least three or four Days before Bathing; and this Bleeding must especially not be omitted by such as are any ways inclinable, or constitutionally obnoxious

to ApopleEtic Fits.

The Season, when to bathe, is proper in all Times of the Year, whenever the Patient's Case requires it; but in chronical Disorders, it is more expedient and effectual to bathe in the best Season, that is to say, from the latter End of May till the latter End of September: And the most proper Time is, in the Morning, about Nine o' Clock; or in the Afternoon, after the Digestion is compleated, as from Five to Seven in the Evening.

Strong robust Constitutions, whose Bodies are plethoric, and abound in Juices or gross Humours, do best to bathe in the Morning: For, at this Time of Day, the lacteal Vessels are supposed to be more depleted, and the Bathing is therefore the less subject to occasion fainting Fits and Head-achs, of which they are

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other-

otherwise in Danger, who bathe in the Evening. But those that have cutaneous Disorders or Eruptions, or are scorbutically affected, must ever lay their Account with Bathing in the Morning: For the Spirits of the Chalybeat Waters are then at their greatest Point of Efficacy and Action on the injured Vessels.

Such as are of a tender weak Constitution, do best to bathe towards Night; for these generally have not Strength enough to bear them out in it, in the Morning; till the Effects of their Dinner-Meal have recruited it, against

the Evening.

Such as have loft their Appetite by Bathing in the Morning, and perceive an unufual Drouziness or Faintness after their Meals, ought to refresh themselves with Bathing in the Evening; or trim alternately their Times of Bathing, Morning or Evening, according as they shall find them best agree with their Constitution.

The precise Time of continuing in the Bath, cannot be determined in general of all Constitutions; but must be regulated by the Disposition, Idiopathy, and Nature of the Distemper of every Patient: For such as are strong and robust, or such as are used to Bathing, can bear to remain longer in the Bath, than those that are weak, of a lax, slaccid, lean Habit, and not used to it. The Phlegmatic can also longer endure it, than such as are of a hot, sanguine Temperament; a Man longer

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longer than a Woman, and the middle-aged

longer than the old, or very young.

Those who are advanced in Years ought not to bathe in the artificial Chalybeat Baths; for the natural hot Baths are more salutary for them; unless their Case or Disease especially requires a Chalybeat Bath (which is very rare) and then it must be administered with the greatest Caution, for Fear of weakening,

instead of strengthening the Solids.

Strong Conflitutions, or those that are used to Bathing, may begin with half an Hour at a Time; and daily raise it with a Quarter of an Hour, till they come to an Hour and an half at a Time; at which Pitch they may continue it for a few Days, according as the Disorder may require it, for which the Bathing is used; and then decrease daily a Quarter of an Hour, down to the primitive half an Hour, and then leave off.

But the weak, tender, hot, old, and very young Constitutions, must begin with a Quarter of an Hour, and never rise to more than three Quarters of an Hour, or an Hour at the utmost; and so descend again gradually. But, if it should happen to any one to be seized with fainting Fits, violent Contractions of the Heart, Head-ach, or other Disturbances of the Animal Machine, during the Time of Bathing; he must immediately quit the Bath, and get into a Bed, there to recover himself; and if this should happen two or three Times successively, he must entirely renounce and avoid these Baths.

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As to the Act of Bathing itself, and the Manner how it is to be performed; when the Bath is properly prepared, the Patient should go into it, dressed in a Bathing-Shirt, with a Cap or Napkin round his Head, and settle himself in it gradually, with as little Motion or Stir as possible: But especial Regard must be had, that the Bath be neither too hot, nor too cold; but temperately warmed to its due Degree. The Water should come up to the Pit of the Stomach precisely, but never upon, or over it. When this is adjusted, the Bathing Machine is covered so, that none of the Steams exhale.

When the Patient is thus placed and fettled in the Bathing Machine, he must sit or lie quiet without any Motion, even not to talk or speak much; and by this Means obtain a gentle Sweat: But, if the Sweat should not ensue, which very seldom happens, then it is necessary, about half an Hour before the next Bathing, to take a gentle sudorisic Powder. Eating and Drinking in the Bath must utterly be avoided, unless it be a little Tea, in Case of Thirst, which may be then indulged. Sleeping also must by all Means whatever be avoided by the Patient, whilst in the Bathing Machine.

Sect. VII. Of Accidents that sometimes intervene in the Bathing; preventive Advice against any bad Consequences attending the Bath; with Cautions against the Abuses of improper Bathing.

Accidents happen from various Causes: The Patient perhaps naturally cannot endure the Bath. The Bath may be too hot, or not warm enough. The Water may be upon, or over the Pit of the Stomach; or the Patient may not have observed the Rules above laid down. Now a Desiciency or Error in any of these Points may occasion a sickly Complaint or Disorder; but if proper Care is taken, these Accidents will generally be prevented; but if they do happen, the Animal Spirits of the Patient must be refreshed and re-invigorated with proper Cordials.

Certain it is, that nothing requires a more nice and accurate Administration, than these artificial Chalybeat Waters: And therefore they are by no Means to be lightly resorted to, and only in very special Cases. They are utterly to be avoided by those who are rich in Blood, or naturally inclined to a costive Habit. Women whose Menses are obstructed; those who have weak Eyes; whose Animal Juices are not sufficiently purified; such as labour under hectic Disorders, slow consumptive Fevers, or the like; to all, in these Cases, these Baths would

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would prove pernicious, and are therefore well forbid them.

Those, to whom these Baths are proper, must bear in Mind, not to make Use of them, till they have prepared the Body, above all, with a Course of drinking the Mineral Waters; or by other Means above suggested. They must not either force a Sweat by too hot a Bath, nor remain too long in the Bath; nor take unnecessarily, or too strong sudorissic Powders, when requisite. For from these Errors chiefly arise any dangerous Accidents, which are therefore to be carefully guarded against.

Sect. VIII. Rules necessary to be observed after Bathing.

For those that bathe in the Morning, from Nine to Ten o' Clock, it is necessary to remain in Bed an Hour after it, in which they should also take a Glass of Wine with proper aromatic Drops, or in some Broth, a Dish of Tea, Cossee, Chocolate, or the like; and then dine between Twelve and One o' Clock; taking Care not to appear in the open Air till in the Afternoon.

But those that bathe towards the Evening, will do well not to come out at all into the open Air, any Time after it, in that Day; but drink some warm Broth or Tea, and divert themselves within Doors, as chearfully as they may: For, if they catch cold upon Bathing, the worst of Consequences is to be dreaded.

APPENDIX.

APPENDIX.

On the Selter Water, in several new Experiments, by the Mixture of Tar-Water, Chalybeats, and other Ingredients therewith; with occasional Observations tending to the Enlargement and Improvement of its Use.

HIS Selter Water comes from Germany, and particularly out of the Circle of the upper Rhine. It takes its Name from the Place, which is called Selter, in whose Boundaries, Nature regales us with its falubrious Streams. It is, here in England, known and reckoned among the Mineral Waters, as the Spaws, Chalybeats, &c. It is imported from abroad, and sold by those, who make it their Business to deal in these Waters among us.

The Selter Water is, with Regard to other Spaws or Mineral Waters, quite of a different Nature. It partakes of nothing Metallic, like the Chalybeats, which participate of Iron-Earth; nor are there any Spirits in them, or scarcely perceptible, like as there are in those of the Spaw, Pyrmont, and such as are called Chalybeats; notwithstanding it has some Propor-

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tion or Share of Spirits, of a different Nature, though they are not volatile; yet the Air is able to weaken and destroy their Nature. Therefore must it be kept close stopped or corked, which will best preserve its Virtues from the external Air; especially in those earthen Jugs or Bottles, wherein it is imported. which are preferable to those of Glass; because these Jugs are made of a Clay, in which probably are contained fuch Particles, as in their Diffolution, contribute to the Virtues of this Water. And I confess, that, I never any where met with the like Clay, or could hear of any, that, in all Properties, was correspondent with that, of which these Jugs are made, except on the Rhine, in the Neighbourhood of this Water-Fountain.

I am requested by many of my Friends, to give a short Narrative of this Water; in what Manner it is to be used, and in what Diftempers or Ailments it is falutary to be administered. Therefore it will be necessary to examine its inward Texture, and, as much as possible, to set its constituent Parts in a true and obvious Light; from whence we may be able to draw these Conclusions, which may instruct us in the best and most proper Uses of it. To these Ends, I shall repeat the Experiments, I have lately made on the Selter Water; that, by the various Discoveries of its own Qualities, they may direct

EXPERIMENTS on the SELTER WATER.

I. It makes but very little Effervescence with Spirits of Nitre. It neither alters its Consistence nor Colour; a little Scum arises on the Surface, just as when you saturate the Lee of Salt-Petre with a clean Alkali, in Order to obtain a Nitrum regeneratum; but if the Selter Water, mixed with Spiritus Nitri, is evaporated to the Consistence of Crystallization, we obtain a Nitrum Cubicum. These Experiments plainly indicate, that the Selter Water abounds plentifully in the soluble Alkalious Earth of common or Fossil Salt.

II. With the sweet Spirit of Nitre it makes very little Effervescence, remains clear and undisturbed; the Spiritus Nitri dulcis smells strong out of it, where the plain Spirit of Nitre is hardly in Smell to be discerned; which, in my Opinion, may be attributed to the effential oily Particles in the Spirit of Wine, which are the chief Cause of the Smell in the sweet Spirit of Nitre, as finding nothing homogeneous in the Selter Water, wherewith to unite, and therefore discover themselves so strong to the Scent.

III. With the *Poubon Spaw*, it makes not any visible Alteration whatsoever; therefore these Waters may, in several Cases, be mixed and administered with great Benefit, as may be farther observed hereafter.

IV. With the Oil of Vitriol, it ferments the most, but not a great deal, nor near so much as this Oil does with common River

Water:

Water; neither does it make the same Effervescence, as with the other already mentioned Acids, or causes any Smell; and the Oil of Vitriol is hardly, after the Ebullition therein, perceptible; which, probably, is owing to the Oil in the Selter Water, which, as a Mineral, is related to the Oil of Vitriol, though not of that corrosive Nature, as the last mentioned; and therefore the readier to unite with one another.

V. With the Geronster Spaw, it makes very little Alteration; but more when the Mixtures with the Pouhon, Oil of Vitriol, and

the Geronster, are poured together.

VI. It ferments with Lemon Juice, in the fame Manner as with the Rhenish Wine. I shall give hereafter an Account, with what great Service, in malignant Fevers, it may be used; as the common Drink, when mixed with the Lemon Juice.

VII. With the Spirit of Salt, it discovers itself again, in its Nature, of near Alliance to the Fossil or common Salt; because it works in the same Manner, as if the Spirit of Salt was poured into a small Solution of common

Salt.

VIII. With a Solution of Alkali, it shews, that it contains a saponaceous Quality; and some of the Oil, not yet uncorroded by the Alkaline Earth in the Bowels of the Earth, unites with a Solution of Alkali; and, as this Solution is more powerful than the natural Alkali Earth, it leaves the same; and the whole soapy Mass unites with the Solution of Alkali, which

which throws itself up to the Surface of the Water, in a Cloud like coagulated Milk, and has a soapy Smell, with somewhat in the Nature of Fuller's Earth; and in washing the Hands therewith, or using it in any Manner, like Fuller's Earth, it will confirm this Experiment.

IX. With Salt of Tartar, it produces the fame Phænomenon, as with the Solution of Alkali; but not so plentifully as with the lat-

ter.

X. With Galls, it strikes no Purple, but it acts in the same Quality, as Galls and Soap, or Soap-Water, and strikes the same Colour.

XI. With Tartar of Vitriol, it discovers hardly any Alteration, at least no more than if you dissolve Tartar of Vitriol in Sea-Water.

XII. With Roman Vitriol it inclines to a White, and separates clear in the Middle; but on the Surface swims a thick whitish Cloud, of an oily Nature.

XIII. With Vitriol of Iron, it separates a Matter, very near half an Inch thick on the Surface, of an Iron-yellow, and an oily Qua-

lity.

XIV. With Nitre, it occasions not any Motion whatsoever.

These are some of the Experiments I have made with the Selter Water; from whence we may be able to form, not only a Judgment of its constituent Parts, or Contents, but also of its Medicinal Virtues; and how far it is able to correct the corrupt Juices in the

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human Body, the Origin of almost all Dif-

tempers.

From these Effects, the Selter Water appears to me to be impregnated with a common Salt, which contains more of the common Salt's Alkaline Earth than of the Acid, which runs through a strong Bed of Fuller's Earth, where the Alkaline Earth dissolves. and unites with the Water, those slimy or greafy Parts peculiar to Fuller's Earth, which make it properly a natural Soap. My Affertion, for the Plentifulness of the Alkalious Earth of common Salt, confirms the first Experiment; then nothing in Nature, but this oluble Alkali Earth, produces a Nitrum Cubicum, in Case the Salt-Petre Lee, or a Spirit of Nitre, is faturated with the fame, instead of another Alkali.

The VIII, IX, X, XI, XII, XIII, and XIVth Experiments confirm my Affertion, in Regard to the Fuller's Earth, and the greafy Parts it receives therefrom; as indeed the foregoing feven Experiments are all tending to the first mentioned Opinion. The Chalybeats, or Spaw-Waters, are also of a greafy Nature, which is fo obvious to every one, who has visited these Wells; that in a few Days, on the Glasses, out of which those Waters are constantly drank, there settles a heavy greafy Matter; but this is quite of a different Nature with that fine oily Quality in the Selter Water, which never leaves any fuch gross and greafy Sediment, to clog and cloud the Glasses, out of which we drink it. And

even those finer oily Parts are so highly digested and incorporated with the Water, by Means of the Alkaline Earth of the common Salt; that they cannot be discerned in any Shape, unless discovered by the last mention-

ed Experiments.

That greafy bituminous Matter, which stains and clogs the Glasses, out of which we commonly drink the Spaw and Chalybeat Waters, is the gross, pinguid Substance or Mucilage of the Iron-Ore; for the richer and riper the Iron-Ore is, the more of this Greafe it contains; which is of fuch a very penetrating Nature, that it will fweat, or stain through the thickest Leather, in less than fix Hours, according to the Use or Motion it is in: For, if it is well shaken in a Leathern Bag, it will fweat the fooner through. This Mineral Greafe eafily unites with fuch Waters as contain Acids; and it has often been a Doubt with me, whether this Mineral Fat was not the chief Medicinal Agent in the Chalybeat Waters; confidering that Quality of powerful Penetration.

Thus I think we have, with Brevity and Probability, explained the natural Composition of the Selter Water; which, as already mentioned, is a very remarkable Concrete, and in no Ways, though a Mineral in its Nature, related to the Acidula, or Spaw-Waters. It contains a great deal of the Alkaline Earth of the common Salt, and more than of its Acid: Yet, notwithstanding, it cannot be called a downright Alkali, or be

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faid that Alkali therein is predominant; but it is properly a neuter or faponaceous one; which, in my Opinion, is refolved into the neutral State, by the earthy Oil it receives from the Fuller's Earth, through which this Spring runs; for it makes the fame Motions, or Effervescence with the Alkali, as with the Acids; and with the neuter Salt, none at all.

—Now we will consider its Medicinal Virtues, and how to administer it in Diseases.

In Obstructions and Suppressions of the Menses, where it is necessary or requisite to destroy the Viscidity or Lentor of the Blood, or lessen its Quantity; this Water, using it with proper Evacuations, as Bleeding or Cupping, is an excellent Remedy. But this Selter Water, in these Cases, ought not to be taken without Exercise: Therefore, such Ladies as are afflicted with those Disorders, ought to drink it in the Summer, five or fix Wine-Glasses full in the Morning; not at once, but by Intermission; and Exercise with it, as much as their Constitutions can bear: And if the same Method be observed in the Afternoon, a short Continuance will produce the De-obstruction of the occluded Canals: And fuch Ladies, who indulge themselves in too much Rest and Inactivity, would find great Benefit, by undergoing, every Spring, a Courfe of the Selter Water.

When the Fibres are dried, and the Nerves and Springs of the human Machine contracted and shrivelled up, if a Flexibility can possibly be expected, I am persuaded it may be effected.

effected by the Selter Water, beyond any Thing I know of in the Materia Medica: Because the soluble Alkaline Earth of the Fosfil Salt is of a penetrating Quality, and imbibed with a stimulating, healing, light natural Oil, which, common Sense dictates, must be of vast Service to the Vessels, thus distempered; and in those Cases, are absolutely the best Diluters in such contracted Passages, which can possibly be thought of. But then it must be used plentifully; and it would not be amiss, if, mixed with Wine or Milk, it were taken instead of common Diet Drink.

In great Obstructions, where the viscous Cohesion of the Particles forms such Masses, as cannot pervade their proper Vessels of Circulation, if they are not grown too concrete or fixed, and are in the least capable of Attenuation and Dissolution, the Selter Water will be a wonderful Assistant therein; will open their Passages, and occasion a fresh vital Stream to flow through them. Or in such Obstructions, occasioned by general or particular Tumours, or Fulness of the Glands; in these Circumstances, I dare say, if any Thing can be expected from a Medicine, it may, with the greatest Safety, from the Selter Water.

The above-mentioned Distempers are, in my Opinion, those which are most incident to the large, populous, and close Metropolitan City of London; which seem to be much occasioned by that thick and heavy Air, which,

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City of London.

Artificers in Metals; as, for Example, Braziers, Pewterers, Plumbers, Smelters, and others without Distinction, who work in Metallic Bodies; must by all Means avoid the Selter Waters in every Respect, both as a Prefervative, and as a Remedy in Difeases. For, as those Artificers receive a great deal of Metallic Dust or Particles into their Bodies, it is reasonable to suppose, that the Obstructions they are frequently liable to, are occasioned thereby; and this Metallic Concrete cannot, by the Means of the Selter Water in the human Fabric, be diluted and carried off; but rather, upon the Account of the Plentifulness of the Alkaline Earth, it is reasonable to apprehend, that, meeting together, they will occafion a dangerous and irrefiftible Inflammation: Therefore it is, by those fort of People, to be absolutely avoided.

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N. B. Artificers in Metals should use as little Salt in their Food, as possible.

The Supposition, that Artificers in Metals are liable to Metallic Concretions in their Bodies, occasioned by the Metals they work in, is confirmed fo much by Experience, that it cannot in the least be doubted. The most remarkable Instances of this Nature are recorded by Sennertus, Dr. Pansa, and Dr. Henkel. This last mentioned Gentleman tells us; in his Treatise De Asthmate Montano, p. 91. That at his first Coming to Freiberg, the chief Mineral Town in Saxony, on the Occasion of Anatomizing two Miners, who both died of the Asthma Montanum, which the Welch Miners call the Bellon, in both their Lungs he found Knots or Concretions of a grey Colour, but confiderably heavy. These he ground to Powder, and feparated the lighter Parts by Washing, and the ponderous Remainder he tried in the Fire; which occasioned a Smell equal, and in no wife different from the Mettalic Fumes in the Smelting-Houses; which plainly indicated its Origin and principal Matter. And this is agreeable to another Account, given by Sennertus, in his Treatife De Consensu & Dissensu Chemicorum cum Aristotelicis, &c. pag. 113. I myself could illustrate this with feveral Instances, that have happened within my own Experience; but for certain Reasons will omit them here, and refer them to a more feafonable Opportunity, when I may, by God's Permission, exhibit my Observations

in a Discourse intire by itself, upon the Miner's

and Smelter's Distempers *.

Artificers in Metals must never come higher in the Mineral Kingdom for Medicines, than to the neuter Salts, Sulphur and Antimony; and those must be administered with the greatest Caution and Judgment that is possible; and never without Preparations of Vegetables properly adapted, such as Electuaries, Decoctions, &c. &c. But, above all, the Fuliginous Oils, or the Empyreumatic Oils, prepared from Vegetables, and suitably corrected, are Panaceas for these Artificers.

In fuch Hysteric Passions, as are occasioned by the Obstructions of the Menses, or an Impurity of the Blood or Juices, and in the Fluor Albus, I have found the Selter Waters, mixed with equal Parts of the Poubon Spaw, an excellent Remedy. This Water Mixture I have likewise found by Experience, of great Service in Obstructions of the Liver, and a great Reliever of acute Pains, occasioned by a Schirrus. But, in those Cases, this Mixture must be drank more plentifully, than the Selter

Water by itself.

In the Neighbourhood of the Selter Water Well, on the Upper Rhine, and in many other Parts in Germany, but particularly in those where they have nothing else but Rhenish

Wine

^{*} As I am requested by several of my Friends, to write a particular Treatise on the Distempers, to which the Miners and Smelters here in this Island, are subject to; I shall perform the same, God willing, as soon as possible; and my Endeavour shall be, for the Benefit of those poor laborious Workmen, to render it intelligible and serviceable to the meanest Capacity.

Wine to drink, they commonly drink Selter Water with their Wines in equal Quantity; whereby it is observed, that, in those Parts, the People are not fo liable to the Gout, Gravel, Stone, Rheumatism, and malignant Scurvy, as their Neighbours, who make no Use of the Selter Water in this Manner; and this is imputed to the frequent Use of the Selter Water. And here, if it were to be farther explained, that the Nature of those Distempers require Sudorific and Nephretic Medicines, with a fufficient Solvent, to diffolve the peccant Matter, and that chalky Humour in the Blood, which are the Occafions of those Distempers; and then, if it were to be farther shewn, if it is not already fufficiently done, that it is the peculiar Quality of these Waters, to cleanse and correct those Humours; it would certainly appear the most natural and easy Medicine, for the Purposes aforesaid. Upon these Motives, I have been induced to advise those, who have been afflicted with the faid chronical Diforders, to drink the Selter Water, as their common Diet Drink; mixed either with a small Quantity of Rhenish, or any other agreeable Wine, or Lemon-juice and Sugar; and this was never done without some Benefit or other, to the Patient.

I cannot omit Observing here, that such who are used to Malt Liquors, and intend to make Use, in this Manner, of the Selter Water, must never begin with Rhenish Wine; because the Tartar in the Rhenish mixes with the Al-

kaline

kaline Earth of the common Salt, which plentifully precipitates in the Stomach; which with that viscid, mucilaginous, pitchy Matter, occasioned by the Malt Liquors, create a great deal of Mischief therein; such as Indigestion, where the Blood itself receives its Share. Therefore it is necessary, that those who will use this Water, as the common Drink, should in the Beginning of their Meals, drink it Milk-warm; take little at a Time and often, till the Stomach is habituated to it; and by those Means, that sizy, pitchy Matter in the Malt-Liquor-Stomachs will be dissolved and carried off.

In Consumptions, this Water has done very great Service; particularly to very weak Constitutions, where the natural Oil, with its stimulating Quality, has reftored the almost worn out Veffels beyond Expectation; particularly in those, who have taken it with equal Parts of Affes Milk; because its Operation is of an easy, soft, alterative Nature: but where there is an Ulcer in the Lungs, it must be omitted, being by no Means safely to be used; because the Alkalious Earth of Salt is too great a Caustic. Therefore such consumptive People, who will use the Selter Water, ought first to consult with a Physician, who will properly recommend, how it may be used as a common Drink, mixed with any Proportion of Milk. But fuch as will take Water with Wines, must chuse no other than the rich and nourishing ones; such as Cyprus, Greek, Hungarian, and Canary.

Sometimes

Sometimes the Stomach is overloaded with fo much Acids, that they occasion a continual Heart-burn; which the Alkaline Salts, and the Testaceous Powders, the usual Remedies, are not able to conquer; because, in those Cases, the Acid in the Stomach is of fuch a fizy, mucilaginous Quality, that it prevents the Effervescence with the faid Alkalies; which is absolutely necessary to remove the Grievance complained of. In those obstinate Cases, Phyficians are obliged to have Recourse, for Relief, to more violent Remedies; that is the Elixir Vitriol. Mynsichtii, which in itself, in proper Cases, is an excellent Medicine; but, in the Heart-burn, I dare venture to pronounce it violent: Because one Acid must overpower another, and therefore will be in every Respect Superior both in Quantity and Quality; whereby the Organs of the Machine will abfolutely fuffer. In these Cases, I recommend Selter Water, as a very fit Medicine to diffolve that flimy Acid, fo pernicious to the whole Machine, without Prejudice to the Constitution; and in those Cases, one Quart of Selter Water in the Morning, and a Pint in the Evening, is a requifite Dose.

In my Practice, I have found Selter Water of great Service in an Anafarca; and it is, in the Dropfy itself, a very fit Liquor for the common Drink: Because it not only quenches the Drought of the Patient, but at the same Time operates by Urine; stimulates the Vessels, and strengthens the Medicines, that are given in their Operation; particularly, the Chalybeats

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Chalybeats work much furer and fafer; if the Selter Water at the fame Time, is given as the common Diet Drink, or used before the Cha-

lybeats were appointed.

In the Gravel, Stone, and other calcarious Distempers, I know Selter Water has been very often of fingular Service. But as at prefent that most noble and valuable Remedy, the LIQUID SHELL is discovered, I cannot recommend it much in those Diseases. vet I think it might not be amis, but adviseable for those Patients that use the Liquid Shell, to take Selter Water, as the common Drink at Meals, as the most inoffensive Liquor; homogeneous, and not fo apt to destroy the Texture of the Liquid Shell. Moreover, the Liquid Shell is in itself a wonderful Medicine; then it precipitates by the purest caustive Alkalies, and in Course with most Liquids in the Human Machine. How shall we account for its Operation? I will not dwell upon this Subject in this Place, as the annexed Differtation is defigned for the Purpose.

Since I have mentioned, above, several other Mixtures with Selter Water, I think it will not be amis here, briefly to inform my Readers of the successful Mixtures of it with the Tar Water, and also the Poulon Spaw with Tar Water. Of the Poulon Spaw and the Tar Water, I ordered an equal Quantity, in Cases where the Mass of Blood was slimy and thick, and the Nervous System at the same Time out of Tone; and where the Nerves required an immediate strengthening, it has succeeded

wonderfully;

wonderfully: And when I found that there was a convultive Trembling upon the Nerves, I ordered a Scruple, or half a Dram of Sal Succ. to each Quart Bottle of this Mixture. The Selter Water, with an equal Quantity of Tar Water, I ordered to fuch who were in a Confumption, occasioned by Obstructions in the smaller Vessels; and by all those Mixtures I always found such Benefits accruing to the Patients, who took them; that I think it incumbent upon me to recommend them to farther Trial.

I think it may not be amis, to hint here the Notion I have conceived, in what the medicinal Quality consists, or what Partes agentes are in the Tar Water; and thereby perhaps clear up the Point, in regard to the Reasonableness of its being a Medicine for the Diseases mentioned, and fit to be mixed with these Waters.

Every one who is acquainted with Chemistry, knows the confiderable Difference there is between the Empyreumatic and Effential Oils. The latter are the Quint-essence of Vegetables; and the first of a pitchy, bituminous, saline Nature. It is observed, that the fuliginous Oils, made out of Animals, upon Account of their saline Nature, in a very small Dose taken, go immediately into the Sanguisication, and occasion a most profuse Sweat: It is also possible to produce this Oil out of every Vegetable, and Tar-making is the very Method to obtain it; and Tar is the Empyreumatic Oil of the Fir-Tree; they are all of

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one rank Smell, yet differ prodigiously in their Nature.

There has always prevailed a Notion among the Chemists, and particularly with Paracelfus, and his Followers; that in those Oils lay a great Medicine undiscovered. This Notion was occasioned by the strange Effects, which a small Quantity of it has upon the Human Machine. Several have been very diligent to discover this Secret, and to find out a Method to administer those Oils with Safety. Mr. Reed is in the right, and it was long before him observed, that the gross terrestrious Parts are pernicious to the Constitution; but he goes a little too far, when he distills also the very Pars agens from it, which is what we want, and leaves us nothing but a distilled Acid, on which I shall be fuller hereafter. Yet nothing was performed falutary on this Inquiry, till the great Bishop of Cloyne discovered to us the Tar Water; and to him alone we are indebted for rendering the Empyrèumatic Oils, a safe Medicine in every Respect.

That great Chemist, Dr. Newman at Berlin, came the nearest to the Purpose intended, when he advised the Practitioners, who will make Use of the Empyreumatic Oils, to rectify them absque ullo Additamento; and also that it was necessary, before the Rectification, to elixiviate cum Aqua calida, the saline Substance out of them, and then rectify it. He tells us farther, that, if this Water was used instead of common Water, to make Lime

Water for Chirurgical Operations, it would be of very great and fingular Service. And that a certain Practitioner, whom he knew, used also this Water inwardly with great Success, in intermitting Fevers and chronical Diseases.

I have already observed, that there is a confiderable Difference between the Empyreumatic Oils; and that one Herb or Wood produces a better and more homogeneous Empyreumatic Oil than another; and also that at last, the long delayed Wishes of the most eminent Men of the Faculty are fulfilled in the Bishop of Cloyne's Discovery; he being the Person, who has hit upon the very best Empyreumatic Oil, the Tar: And he is also the Person who has found out its Method of Depuration by the most natural Menstruum; and Art has the least Share therein; in Consequence whereof, the Medicine is so much more agreeable with, and falutary to the Human Constitution.

I cannot help thinking, that the first Use of Tar was purely medicinal; which Conjecture of mine is in general supported by the antient Writers, Pliny especially: Though in none of them can be found, that I have yet met with, a clear or distinct Account of its Qualities, or the Manner they used it in. But it is hardly possible, that the Antients, who sought for their Medicines chiefly in the Juices of Plants and Vegetables, should overlook so considerable an Extraction. Thus we know, that the Emperor Claudius promulgated an Edict, commanding his Subjects to rub or anoint

anoint the Infide of their Wine-Vessels with the Juice of the Taxus, or Yew-Tree; as being a Remedy or Preservative against Poison: But Dioscorides expressly affirms, that Tar itself

is a specific Antidote against Poisons.

From hence we may agree with the Notion, or rather be confirmed in it, that the Empyreumatic Oils extend their immediate Power to the Nervous System; under which the Blood Veffels are comprehended. This System receives the first Sensation of all Distempers whatfoever, that have their Seat in the Blood. For Instance, if the Blood is too thin, the Vessels suffer by its rapid Motion; if too thick, they suffer for want of Motion; if inflamed or obstructed, the Vessels are the Boundaries of the peccant oppressive Matter, and so vice versa, and must split or corrode, unless timely relieved: and therefore the Empyreumatic Oils, if properly prepared, are without doubt the very Medicine wanted in those desperate Cases. It immediately performs its Duty, and at the same Time stimulates the Nerves, whereby they are affifted to support the Removal of the Disorder.

Last June, I had an Experiment communicated to me, upon the Tar Water, by a Gentleman in the Country, who delights in Chemistry; and this very Experiment will corroborate what I have said concerning the Affinity between the fuliginous Oils and the Nervous System. His Words are as follow:

"I took a Piece of Hog's Gut that was newly killed, and into one End of it I poured

er poured two Tea Cups full of Spring Water, fo foftened, that it was as fine as Wa-" ter distilled; then tied it up with a String: " Afterwards I took two Tea Cups of that " excellent Tar Water, as it may be very " well called for its Goodness, and poured it " into the other End of the Gut, which I " also tied up. In the mean time, I had " prepared about half a Gallon of Water, " foftened in an earthen Vessel, over a Sand " Bed, which I call my Balneum Mariæ. Af-" terwards I suspended the Hog's Gut in the " Bath, and covered it over with two or "three Sheets of Cap Paper, as is usual on " fuch Occasions; and there it was kept in " the Bath for about fix Days and Nights. "Then I took it out, and found, that the " End of the Gut, which had the Water in " it, gravitated lower, as I observed before, " at the first putting it into the Bath. Then " I took a Pair of Scizzars and cut an Orifice, " and emptied the Water into an earthen " Vessel; and that End that had the Water " in it, was putrified and had a fetid Smell; " and the other End of the Gut that had the " Tar Water in it, was of a brown Colour; " and by turning the Infide out, it was a " little contracted, and had a brown Fur on " it as if it was tanned."

Is it not easy to suggest, or conjecture from this Experiment, that Tar Water dissolves the Obstructions in the Vessels, and re-instates them to their former Nature? Then the X Word

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Word Tanned, which my Correspondent makes use of, fignifies nothing more, than to diffolve the flimy, corruptible Matter upon the Skins or Cuticles of Animals; and, without destroying, only cleanses and fibrates them. The Obstructions in the Vessels are also nothing else but a dirty, slimy Matter, in all Shapes corruptible and detrimental to the Constitution, occasioned many different Ways; and this the Tar Water is able to refolve and diffolve; and at the fame Time strengthens the Nervous System, when Nature is performing her Duty, in removing the peccant Matter: And this is not only confirmed by the faid Experiment, but also by the indubitable Testimonies of Experience, in many other Examples.

The Bishop of Cloyne proposes, in two Letters, the one to Mr. Prior, and the other to the Rev. Mr. Hales, Tar Water as a Prefervative, and Remedy against the Plague; and indeed he is not mistaken. Tar Water. confidered in the above-mentioned Light, must be therein of great and fingular Service. The infectious Particles always attack first the Nervous System, and this communicates the Loimus to the Blood; fo that an immediate penetrating Medicine is required in this Cafe. The Smell of Tar alone is esteemed one of the best Preservatives, only to use it by way Smell, to prevent the Loimus from taking Root; because a fragrant or sudden strong Smell has an immediate Impulse, and communicates at once to the whole Nervous SyfOn the Selter Water.

tem the effential active Parts of the Matter finelled to *.

From what I have here faid of the Tar Water, a Conclusion may be drawn, I apprehend, that its medicinal Power lies in the Empyreumatic Oil, and that this Oil is absolutely necessary for the Tar Water, to answer the intended Purposes: Mr. Reid has communicated a Method in a Letter to the Rev. Dr. Hales. how to extract the Acid from the Tar Water: which Acid he thinks will answer the medicinal Intentions of Tar Water. But I am afraid he is mistaken in his Notion. For, when the Empyreumatic Oil is entirely separated from this Acid, it is not in any Shape Superior to any other distilled Acids or Vinegars whatfoever; and what those are able to perform in Physic we know, without transcribing what our Fathers have so plentifully instructed us, on that Head. The medicinal Power depends then upon the ofen mentioned Empyreumatic Oil; but we may allow at the fame Time, that

^{*} It has been frequently experienced, by many Inflances, that nervous Distempers have been entirely cured by Smells. Brimstone dissolved in expressed Oils, and mixed with a small Quantity of Oil of Nutmegs, and of this two or three Drops, very often rubbed between the Palms of the Hands, and then strongly smelled to, by applying very often the Hands, fo rubbed, close to the Nostrils, has been frequently known to cure the Itch. It may perhaps be here objected, that this Ointment would prove a Remedy for that Distemper, if consined to the Hands alone, and by being rubbed only between the Palms of them, without making any Application thereof to the Nose: But of this I can give Assurance to the contrary: For I have caused it to be tried by frequent Rubbing upon the Palms only, but never could produce the desired Effect; unless the frequent Smelling to it, was also observed.

its own natural Acid is the chief Corrector, whereby the Tar Water can be improved when it is requisite; and we are indebted to Mr. Reid, who has instructed us how to obtain

it plentifully.

I doubt not, in the least, but that Mr. Reid is able to oppose me with unquestionable Facts, that his Acid Juice hath answer'd, in feveral Respects, the Intentions and Purposes of Tar Water. But, in answer to those Objections, I say thus, that I have not yet seen any Acid Juice of Tar, from which the Empyreumatic Oil was intirely separated, which is confirmed by Mr. Reid's Experiment, related in his Postscript, pag. 43. where it appears, he obtained ten Grains from an Ounce of Acid Juice, of an Amber-coloured Rob, as he is pleased to call it. And if there is any Thing performed by this Acid Juice that has answered the Ends of Tar Water, I am very well fatisfied that it is owing, and may very justly be attributed to the oft-mentioned Empyreumatic Oil, which was contained in the Amber-coloured Rob. But let him separate this Ambercoloured Rob from his Acid intirely, and then fee, if it can perform any more than the common distilled Acid. I grant also to Mr. Reid, that there are many Constitutions, to which Tar Water may be hurtful in some Respects, and that for these, in particular, the Empyreumatic Oil is not fufficiently tempered. But then, we are furnished with Multitudes of Ingredients in the Materia Medica, wherewith to correct it. And for this very Reason it is, that I here take Notice of the Tar Water, that where Causes and Circumstance, require more Acid, in Conjunction with the fuliginous Oils, as much of Mr. Reid's Acid Juice may be mixed or added to the Tar Water, as is wanted; for, by this Means, it may be sufficiently corrected and adapted to the Occasion: But then it must here also be observed, that there is nothing in the Materia Medica, that can do Good, but it is able to do also a great deal of Mischief; and, in course, it is reasonable to expect the same from the Tar Water as a powerful Medicine: Therefore it is the Physician's Business to correct these Inconveniences.

I have myself, of late, ordered some of this Acid Juice to be added to the Tar Water, in the confluent Small-Pox; and if I had not feen the furprizing good Effect myfelf, I never could have believed it. Therefore, in this particular Case, it may be aided and affisted with the Acid Juice. In other Cases, such Ingredients, as feem most requisite, are entirely left to the Judgment of Nature's Ministers; but to rely on one Thing alone, and to maintain that it confists in that only, as Mr. Reid does, carries no Chemical Reason with it: Wherefore I hope, Mr. Reid, from his Chemical Capacity, will recall to mind that ancient universal Chemical Maxim, "That all Things, both So-" lids and Fluids, are Compounds in them-" felves, and Bodies, to be feparated by the " Spagyrical Art, ad infinitum." And if this is the Case, how can he, according to the same Rule,

Rule, suppose his Acid Juice to contain the only falutary Agent. I am also surprized at the many Names Mr. Reid gives to the Oils, fupposed to be in the Tar Water; sometimes he calls them Caustic or firy Æthereal Oils, Names at this Time a-day, unufual and uncommon in Chemistry; as we distinguish no more than the Essential, or the Distilled and the Empyreumatica or fuliginous Oils in Chemistry; to which some will add the Expressed Oils. And whereas Multitudes of Names given to Chemical Productions, have occasioned innumerable Absurdities in this noble Art; I hope Mr. Reid will not be displeased, that I take this little Notice hereof; and as I know, in a great many Instances, especially in green Wounds, that crude Tar is an exceeding good and great Confolidator, of which it may be too tedious to mention here the Particulars: therefore is it utterly impossible, that any caustic Quality can be therewith united.

Thus much, I think, is enough of the Tar Water, as I have already mentioned the Reasons which induced me thus to take Notice of it, in this Place. I will now set forth, of what great Efficacy I have found the Tar Water when mixed with the Selter Water, in gouty Constitutions. We know in these Distempers, the Nerves and Joints are infected with a calcarious Matter, which must be dissolved and expelled, before any Relief can possibly be expected; and as the Selter Water softly dilutes and dissolves, without any Disturbance to the natural Occonomy; and as the Tar Water,

by its Qualities, is a powerful Diffolver and Expeller of those terrene Parts, and also a kind Bracer and Strengthener of the Nerves; I have made a Conjunction and Mixture of them together, and fucceeded to my Wish. In those Cases, I commonly directed, of the Selter Water two, and of the Tar Water one Part; and of this one Pint, or a Pint and half in a Day to be taken; but where the Nerves are very much enfeebled and relaxed by hard Drinking, I appoint equal Parts of the Tar and Selter Water, with half an Ounce of Mr. Reid's Acid Juice to each Bottle of this Mixture: But if the Nerves are fo feeble, that the Weakness is itself a Distemper, I order, instead of the Acid Juice, half a Scruple, or more, of Volatile Salt of Amber, to each Bottle: And this I have frequently found of fuch great Efficacy, that I dare confidently recommend it to further Use.

In continual or malignant Fevers, where the Blood is inflamed and vitiated, its Texture spoiled and destroyed to that Degree, that it is become putrid; where there is an Obstruction of the Bowels, an Obstipation of the Pores, a Stoppage of almost all the Capillary Vessels, and a very sharp Acrimony, intermixed with the Fluids; in these Cases the Selter Water, impregnated or mixed with the Juice of Lemon, and Dr. Stabl's Pulvis Antispasmodicus used long with it, I have feen the greatest Success imaginable. In those Circumstances, the Patient must drink plentifully of the Selter Water aud the Lemon Juice, or any other pleafing X 4

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fing Acid. From what hath been faid here of the Nature and Quality of the Selter Water, and from what may be confidered of the Origin and Nourishment of these Distempers; this Assertion will not only appear reasonable,

but beyond Dispute.

As all Liquors, without Distinction, require a particular Manner, agreeable to their Nature, for the Management and Usage of them, if they are to be preferved fome Time for fome intended Purpose; so indeed, the Selter Water requires a very particular Method in this Respect. Then, as its Nature is very different from those Medicinal Waters, which are called Chalybeats, it is reasonable to suppose, that, in respect to its most commodious . Preservation, it requires another Method, than the Chalybeats imported into this Metropolis. And, for the Truth of this, I appeal to the Mineral Water Dealers; who can certify, how foon, and quickly after the Importation, it is apt, for want of fufficient and judicious Care, to corrupt, and putrify, to fuch a Degree, as will make it become very offensive to the Smell. Those Dealers have tried several Means, ineffectually, to preserve it; and finding it impossible to dispose of the Quantities imported, fo foon, as to prevent this Damage; they have hitherto commonly attempted to prevent the same, by opening the Jugs wherein it is brought from Germany, and pouring a certain Quantity of Spirit of Vitriol into it; so seal it up again. By this Method, they do indeed preserve it from Putrefaction; but this,

like the Brewery of Wines, fophisticates the Water, and consequently disappoints us of its natural Virtues. It is hereby altered in its Nature, and inevitably contracts a different Quality, from that which it contains in its sincere and genuine Purity; and may be highly detrimental in those Cases, wherein all Acids are to be omitted, and it is required neat, simple, or unmingled by itself; as in Consumptions, and several other Disorders.

However, there is a Method to preserve it untainted, and unadulterated by any Mixture, in its own natural Confistence; and as without any Addition to the Water, for this Purpose, so without opening the Jugs: And, for as much as I can learn, there are none of the Mineral Water Dealers in this Town acquainted with this Method, except the Person here under-named. This Method confifts, in giving strict Orders, that the Jugs be very well corked, and fealed with Pitch, as foon as they arrive; to store the same in a proper Place. and then to cover them with a certain agreeable Mixture, through which the Air may play upon the Jugs, that contain the Water. This is always carefully observed by Mr. Farley Jones, Purveyor of Mineral Waters to his Royal Highness the Duke of Cumberland, who keeps his Warehouse in Tavistock-street, Covent-Garden; and I must say so much in his Praise, that I have always found his Selter answer their medicinal Standard here in London: And thus much may suffice at present upon this Subject.

A

DISSERTATION

ONTHE

LIQUID SHELL;

WITH

Instructions to prepare the same.

of the Liquid Shell, deferves so much the Regard of the Public, from its signal sovereign Efficacy in nephritic Disorders, the Gravel and Stone especially; that it cannot but receive favourably the following Communication of it. Be it said, without Offence, it is a Remedy, according to all the Principles of true Physic, confirmed by Experience, far superior to that celebrated one of Mrs. Stephens's, though the Patronage, and easy Belief of some leading Men, raised it to the Dignity of parliamentary Notice and Reward.

The Honour of the first Discovery of this Process on Shells is certainly due to a Gentleman calling himself Baron Schwanberg, a Native of Germany, who was not regularly educated either as a Physician, or Professor of Chemistry; but being especially determined towards the spagyrical Art by his Genius, or

rather

rather the Genius of the Nation, which is eminently turned that Way, applied himself very diligently to the Study of that Science, in which a laborious, unwearied Exactness, both of Practice and Judgment, are such indispensable Qualifications, and, indeed, compose an established Part of the German Character.

This Gentleman then, either by the Lights of his own Genius, or pursuing the Notions of an Alcabest, in the Writings of Paracelsus or Van Helmont, two Authors who are scarce ever esteemed, or despised enough, hit on this Method of a Magistery, or Solution of Shells, by Calcination with Sal Ammoniacum. But, as I never had any Intimacy with this Delighter in the Art, nor ever learned that he was communicative of fuch Secrets, as he discovered in his Researches in it; but was, on the contrary, unphilosophically tenacious of them, it cannot be fairly fuggested, that I came at this Secret by any unfair Means; especially when I shall fully shew, that I owed my Discovery of it to a Chemical Analyzation, that foon gave up the Contents of it to my Research and Experiments.

Observing in the public Papers, that such a Medicine was advertised, under the Title of the Liquid Shell, and said to be prepared from Shells; I sirst began my Attempt to sinelt Oister-Shells with the Liquid Salts and Salt-Petre; but the Liquor I obtained not answering the same Characters or Tests, as that of the Baron Schwanberg's, I had recourse to another Method; and, taking three or four

Ounces

Ounces of his Liquid Shell, I put them into a proportionably fmall Retort and distilled The Liquor I obtained was fomewhat spirituous, and made plain to the Sense, that its Origin was from the Sal Ammoniacum; and upon this I worked the Oister-Shells with Sal Ammoniac, as I had before unsuccessfully done with Alcaline Salts and Saltpetre, when I readily obtained a Liquor identical, in all Respects and Characters, with that fold under the Baron's Name, which I still retained, as I very justly allow him the Honour of the Invention. But as I had perfected this Difcovery long before any Attempts, that I ever heard of at least, were made to monopolize it under a Patent, I confidered myself as under no Tie or Obligation, to conceal or withhold from public Practice, a Remedy fo very beneficial to Mankind.

But, as fince my communicating to many the Process of the Liquid Shell, Mr. Baker, a Person whom I am not in the least acquainted with, but by his Character of a Seller of Nostrums, has obtained a Patent, under which he presumes to engross the Sale of this Medicine; I think it, therefore, incumbent on me, before I proceed to the Process itself, to relate my Conduct after I had discovered the component Matter of this Medicine, and therein vindicate to the Public its Right to it in common with the rest of the Materia Medica. Though I am indeed not Lawyer enough, to decide, under what Suggestion or Pretext Mr. Baker could sue the Patent out,

Differtation on the Liquid Shell. 317 as the Invention was confessedly not his, but detected, long before he obtained one. For. as foon as I had perfected the Discovery of this really valuable Medicine, I made not the least Reserve or Secret of it; or got one Farthing Profit to myself by it. I ever had too great a Contempt for any empirical Stile in Physic, to affect, or set to sale, Secrets in it. For though I had frequently made use of this Medicine in feveral Cases, with prodigious Success, I acquainted Numbers in North-Wales. Cheshire, Yorkshire, Derbyshire, London, both with its Ingredients, and the Manner of its Preparation. But especially when I came to London, finding that Mr. Baker had fixed it at too high a Price for the Poor, to come eafily at it; upon a Recommendation to me of Mr. Proctor, who has kept a Shop for fome Years behind the Royal Exchange, I put into his Hands the Process of this Medicine, with an Account of its Properties, and Uses, on his Engagement to make it genuine, and at an eafy reasonable Price, within the Reach of the Poor as well as the Rich: And, for the Service of the Public, I wrote Directions, how this Medicine was to be used, with regard to the various Distempers, it was specifically applicable to; and permitted it to be advertised with my Name.

This Advertisement of the Liquid Shell, in my Name, was accordingly made in the Whitehall Evening-Post, of Saturday, April 30, 1748. And further, to evince my Disinterestedness in the Affair, and that I had no other

other Defign, than that the Public should be freely and openly ferved, I obliged him to infert in that Advertisement, that I would shortly publish the Medicine with its proper and authentic Process of Preparation; that the Country Practitioners might not be at the Expence of fending for it from London, or be any wife imposed on in the Composition of this Medicine: which Promise I also made to feveral Gentlemen of Distinction, with whom I had the Honour to be acquainted with in the Country, and who, from their Regard to the Public, and the Proof they faw of the Efficacy of this Medicine, thought it could not be too foon divulged; and indeed it is with Regret, that I saw myself obliged to delay it fo long, on Account of my Publication of the foregoing Treatife on Mineral Waters, to which I had in a manner tied myfelf to annex it.

Mr. Baker advertised his Patent (as I apprehend) the first Time in the Gazette, August 2, 1748. But, in some of his latter Advertisements, he has inserted, that some "People, in Contempt of Royal Authority, "did still persist in selling this Medicine"; and as none that I know of, but those who derive their Preparation of it from my Communication and Instructions, are concerned in vending it, I think myself so far obliged to take Notice of Mr. Baker's Intimation, as to assure him, that he greatly mistakes the Point, if he brings the Royal Authority into the least Question, in this Affair, or imagines it to be

Differtation on the Liquid Shell. 319 at Stake, in the honest, and innocent, and commendable Intentions of those, who sold the very identical Medicine long before he had obtained his Patent, and that under the Name of Baron Schwanberg, purely because the Invention is really due to him in the same Way, as other Medicines bear the Names of their Inventors; such as Elixir Bateanum, Spiritus Mynderi, Elixir Vitrioli Mynsichti, the Countess of Kent's Powder, and a Number of others, and which are generally the best Receipts in the Materia Medica.

For my part, I am far from contesting with Mr. Baker his Property in his Patent, Valeat quantum valere potest. He may sell, at what Price he pleases, this famous Composition; but I presume the Prerogative, he has sheltered it under, does not exclude the Public from its Right to a Discovery made, and advertised long before the Patent was obtained: And it is the Public which is now to judge of the different Proceedings of one, who, for Lucre-fake, turns this Remedy into an Empirical Monopoly, and of the other who gives up a Discovery, which was the Fruit of his Refearches for the Analysis of this excellent Medicine, freely to the Service of Mankind, without the least Reward, but the Pleasure of doing Good.

Besides, Mr. Baker may make himself easy with regard to what, he calls counterfeiting his Nostrum: For I shall here insert three Processes of Preparation; two of which are considerable Improvements on the original Com-

position

position of Baron Schwanberg, which I candidly and readily submit to the Public, and presume the Chemists, Apothecaries, or Dealers in Medicines, may take their Choice of them, without invading any one's Property, or Privilege.

PROCESS the First.

N. B. This is the one, that produces the Liquid identical with that of the Patentee's, fold under the Name of Baron Schwanberg's LIQUID SHELL, as any Chemist may easily fatisfy himself, by reducing it analytically to its Principles.

"Take common Oister-shells green, as they " are brought in their Season to Town, and " not fuch as are calcined or whitened by Nature; wash them clean with common Wa-" ter, let them dry of themselves; then " pound them in a Stone or Iron Mortar, into " a gross Powder, of which take one Pound " (for Instance, of a certain Quantity) of Sal " Ammoniac, well powdered, one Pound and " three Ounces; mix the Powders well toge-" ther, and put them into a Crucible, which " fet in a Wind-Furnace in a quick Smelting-" Fire. (N. B. The Crucible should not be " quite full, because, as the Matter smelts, the " Ebullition will cause it to boil over.) Keep " it on the Fire, till all Motion or Ebullition " is over, in the thus smelting Materials, " which should appear to the Eye, just as the " Alcaline Salt, or Pot Ashes, do in their " fmelting State. When the Oister-shells and " Sal

" Sal Ammoniac are come to this Point; take the Crucible from the Fire, and pour it

"into a glaz'd earthen Veffel. This Matter

" will run in the Air of a damp Cellar, per

" deliquium, which Liquor is to be filtrated,

" and gives, or is the Liquid Shell."

To the foregoing Process, I have the following Objections. The Air in a damp Cellar, or elsewhere, dissolves only the Alcalious and very little of the oily Parts contained in the Oister-shells and Sal Ammoniac; and at the same Time that vitrioline Acid, with which the Air is universally impregnated, infinuates into this Liquid, and greatly divides and weakens the oily Parts, which gives this Mixture that saponaceous Quality, in which we must principally seek its medicinal Efficacy on Distempers: therefore I would recommend the Lixiviating it with Water, as a more valuable Process; and is thus.

PROCESS the Second.

"Take of Oister-shells (as above) and Sal."
Ammoniac, equal Parts; powder them as pre-directed, and put into a Crucible, smelt them as before; pour out the Contents, and powder them whilst warm in a warm Iron Mortar; which done, put into a strong well glazed earthen Vessel, to which affuse about one Pint and a half of Water, to so much Matter as is obtained from a Pound of each thus prepared; let it stand in a warm Place, or Sand-heat, for 24 Hours;

" stir it often, then filtrate it, and keep it in

" Bottles, for Use."

The Liquid Shell thus diffolved with Water, is not even inferior in Strength to that obtained per deliquium, as in the first Process, and therefore to be taken or given in no greater Doses, but in equal Quantities with the first; but its medicinal Virtues are far superior. The Water, that is used for this Solution, must be a soft, light, and limpid Water, not in the least Degree hard, but containing as little as may be of earthy or saline Particles.

That this Liquid Shell made after this second Paoces, is superior to the first in its medicinal Operations, I have verified by repeated Experiments, as well in Chemical Trials of them on Stones and Gravel, obtained from Human Bodies, as upon Patients in Nephritic Cases, who found much speedier and more effectual Relief from this second Method of Preparation,

than from the first.

Farther Reflections however suggested to me a farther Improvement on this powerful Medlcine, as follows.

PROCESS the Third.

"Take of more minutely powdered Oy"fer-Shells, Ounces eight; of Sal-ammonide"
well powdered, Ounces four; mix them
"together; put into a Crucible, and calcine
in a Cement Fire, for an Hour and an half.

" (N. B. A Cement Fire is no greater Degree of Heat, than that both the Crucible and Matter

Matter are red bot, but not so much as to

" smelt like as in the first and second Process is

" necessary.)

When the Matter is Calcined or " burnt into a Lime-like Mass, take it out " and powder it; and whilst it is warm, pour " two Quarts of clear, light, foft boiling Wa-" ter upon it, and let it stand in a Sand-heat, or in a warm Place, near the Fire-fide for " 24 Hours; in which Time it must be often " stirred and then filtrated, when it is ready " for Use. Which Dose is a Wine Glass full " at a Time, as often as the feventy Drops " are prescribed, in the Article of Direccc tions."

Liquid Shell made after this last Process, I have found yet more fovereignly beneficial in Nephritic Disorders, than the Drops; though the last are preferred by many, on account of their being given in a smaller Volume, and for that very Reason they are less effectual: For in this last Process the saponaceous Quality and Atoms of the Oyster-Shells are more divided and expanded in that natural menstruum Water, the fooner they unite with the animal Fluids, readier pass through the Circulation, and do not lose so much in the Digestion, as when the Contents are concentrated into a narrow Compass: therefore I recommend specifically this last Preparation to all afflicted with Nephritic Complaints, as a Medicine they may expect the most fignal Relief from, of which I have feen furprifing Instances.

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These are the several Modes of preparing this so justly esteemed *Medicine*, that have hitherto occurred to me; to which I proceed to subjoin certain Considerations of its *Origin*

and Medicinal Use.

Concerning its Origin, it is certain, that this Remedy is not of modern Suggestion; for most of the spagirical Practitioners in Physic, from distant down to the present Time, have had a great Opinion of the urinal Salts, and confidered them as proper Matter to work Medicines out of; their Reason for which was, that these Salts more homogeneously conveyed their medicinal Contents into the Animal Fluids; and indeed the general Success that has ever attended a judicious Use of them, has sufficiently authorised the Practice. Thus too there is a Powder fold under the Name of Baron Shwanberg, which is also no modern Discovery, but a revived Medicine, being nothing else but a Diaphoretic Antimony, made with the Salt of Urine.

That once celebrated Lithotriptic, the true Ludus Paracelsi, so much mistaken by Van Helmont, was nothing else but the Stone extracted from a Human Body, Calcined into a Salt, and suffered to run into an oleum per deliquium in a damp Cellar; of which the medicinal Contents are justly pointed out, by Dr. Gideon Harvey, in his Book called the Vanities of Philosophy and Physic, &c. page 117. (of which by the by many Folio's might be made) where he says thus: "Whatever Virtue may be supposed to be in this Stone (viz. the

Ludus

Disferation on the Liquid Shell. 325 "Ludus Paracelsi) is to be attributed to the "Sal-ammoniac that is in it."

On which it feems very plain, that the Capital or Gift of the Virtues of the Liquid Shell was known to the Ancients, in the fame Intention it is now used.

The same Author last quoted, has also pursued this Opinion of the Sal-ammoniac, as to come very near indeed to the Composition of the Liquid Shell, in the following Process, which I copy out of the same Book, page 118. §. 12.

"In Conclusion, my Opinion, touching the Virtues of those prenumerated Stones, is,

"that Flints rendered brittle by Ignition, in

"Water, or Small-beer, or Wine, wherein a good Lump of Sal-ammoniac hath been

"diffolved and afterward ground into Pow-

" der, taken in large Doses, in a Draught of the same Liquor, wherein it hath been

" quenched, may be endued with a far

" greater Power to drive down Urine, Slime, and Gravel, and diffolve the Stone by a

" long continued Use, than any of the most

" celebrated of them."

Here we have Sal-ammoniac, and a Lime in Mixture, fo as to form a Liquid: and indeed the Liquid Shell is not very effentially different from it, fince the Lime it contains is made of Oyster-Shells, whereas the other is made of Flints.

The famous Dr. Hoffman's Spiritus antipodagricus egregius, which has made so great a Noise in Practice, on account of its sovereign Efficacy

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in Nephritic Disorders, and even in the Goutifelf, of which it asswages and mitigates the Fits, giving great Ease and Relief from the exquisite Pains of that Distemper, by dissolving the malignant calculous Matter in the Joints, is nothing else but Spiritus Salis ammoniaci sulphureus, in which a very small Quantity of Camphor is dissolved, whereby it is rendered saponaceous: and this Medicine pervades all the animal Channels in its primitive Nature, even to the extremest Parts, where, as pre-observed, it dissolves the earthy, chalky Concretes it meets with; which penetrating Quality is obtained from the Sal ammoniacum.

Here we fee that the Sal ammoniacum, or the Preparations thereof, have been esteemed as Nephritic Medicines, in too ancient Prastice to pass for a modern Invention: because somewhat modified and disguised, into a Composi-

tion, to beg a Patent for.

There were certain Remarks inserted in the Gentleman's Magazine, for October, 1746; wherein a nameless Author attacks this valuable Medicine, and has the Charity to deter or dissuade the Public from its Use; but his Arguments are built on such false Principles, his Conclusions are so injudicious and unphilosophical, that I might well spare the Resutation of them, which I shall however briefly undertake, for the Sake of those, who for want of Depth enough in Physics and Chemistry, might espouse the Prejudice, the Author attempts to inspire.

The Author of these Remarks attacks the Trial afferted to the Public, viz. that a Human Stone could be and frequently was dissolved in a Phial with Liquid Shell; in which, he tells us, "That he procured some of the Liquid Shell, in which he has put the Human Stone formed in the urinary Passage, upon which a white Sediment precipitated; and that he obtained the like Sediment, when a few Drops of Hartshorn were dropped into the same Liquor; and from thence he draws the Conclusion, that the Powder obtained by the Human Stone was nothing else but the burnt Lime of the Shells."

I grant him readily, that fuch a Trial, as he mentions, would produce him no other Precipitation, than the burnt Lime of the Shells. and that his Human Stone remained undiffolved by this Liquid Shell; nor ought he to have expected any thing elfe from fo crude an Experiment: For I do not find that he accompanied it with a proper Share of Dilution, which is necessary to all dissolvent Menstruums. Aqua Fortis and Aqua Regia are unquestionable Diffolvents of the noblest Metals, Silver and Gold, yet are ineffectual upon them, until diluted with common Water to a competent And it is indeed the same with the Medium. Liquid Shell, which will without any Difficulty amalgamate, foften, and diffolve the Human Stone or Gravel, if duly diluted and prepared.

Silver, or Gold, or any other Metal or Mineral, that we propose to dissolve, must also

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be clean, uncloyed, or foiled with any Greafe, or Dirt, or the respective Menstruums cannot well exert their diffolvent Faculty. It is the fame with this Stone of the Human Body; for if it is become greafy by handling, or crusted over, in Time, by the Action of the external Air upon it, when long extracted out of the Human Body, or, if recent extracted, it is clogged with digested Matter of inward Ulcers, then we must not expect that the Liquid Shell will dissolve them; and for this Reason gentle Purges are expedient to be taken with the Liquid Shell, to expel fuch exulcerated Matter, if any is fettled on those Calculous Concretions, to clear the Way for the Powers of it, over the Root of this dreadful Diftemper.

This Letter-writer proceeds to tell us, "that "he evaporated the Liquid Shell to a Dryness, and there remained a small Quantity of lixivious Salt, probably of Soap Lye." To which there is no other Answer due, than that it is plain this Experimentalist was mistaken in his Conjecture; which could not be furprizing, since his Method of Analyzation had produced him so little Acquaintance with the real Principles, or Components of his Sub-

ject.

As to the Use of Soap Lyes in Physic, for which he declares his Opinion, "of its being "known to be a powerful Dissolvent of these "Stones:" I shall only say, that forry I am, that this pernicious dangerous Drug has received the Sanction it has, from several Gentle-

men, eminent not only for their Science, but their confessed Beneficence to, and Love of Mankind, with whose Safety or Relief in Nephritic Disorders there can hardly exist a more incompatible Agent. For, Soap Lyes being in its Nature a perfect fluid Caustic, or dissolved Lapis infernalis, what Danger must not attend its Reception into the Body, when the most common and concomitant Symptoms of those Distempers are Ulcers or Wounds in the Kidneys, uterine, or urinary Passages, in which Case this becomes a mortal Poison? Yet how fashionable is the Use of it?

Nauseating by its Volume, as Mrs. Stevens's Medicine may be, yet is it more rationally, more fafely adapted to the Human Body, at least is not liable to that mortal Harm, as the plain unguarded Soap Lyes. For the Alicant Soap, one of its Ingredients, is not only made of the mildest Alkali, the Spanish Kelpt, but its caustic Quality is also mitigated by its Grease or Fat, and therefore not so fatally obnoxious,

as the Soap Lyes.

Too many have been the Cases that have fallen within my Observation, wherein the simple Soap Lyes taken inwardly, have acted terrible Tragedies, and brought on a most painful Death: And, considering how well known its caustic Qualities are, it is surprizing that such a pernicious Practice should obtain the Vogue it has, at the Expence of all Reasoning in Physic, and of something so precious as the Life of Man.

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The Letter-writer afferts, that the Sediment in the Urine, of those that take the Liauid Shell, is no other than common to those who take flaked Lime, which will produce the same Appearance; which is no Wonder nor Detracter from the Praise of the Liquid Shell, whose Operations are analogous to that of flaked Lime, and only much more powerful from the Super-addition of the Sal ammoniacum to its own Lime of Calcined Oyster-Shells. For, known as it is that all testaceous Powders are more or less diuretic, confists it not with the Truth of Phylical Reasoning, that the diuretic Faculty of the Oyster-Shell Powder. diffolyed by fuch a Menstruum as the Sal ammoniacum, must be usefully carried to the Root of the Distemper, in Conjunction with this Salt, which in its primitive Nature pervades the whole animal System, without losing its Power in the first Digestions, which other Medicines are fo liable to? And, being a powerful Solvent of the earthy Concretes called Stone or Gravel, it is thus urged together with the testaceous Commixture, to its Work of fcouring, cleanfing, wearing away, and mouldering the cruel obstruent Matter: Whereas other Remedies, less adapted than the Sal ammoniacum to its Circulation with undiminished Virtue through the animal Fluids, require more Time to prepare them for their Reception, and are ultimately transmitted to the Seat of the Disease, with most of their Efficacy lost by the Way. And for this Reason, the Liquid Shell is so efficacious, even in the fmaller

Differtation on the Liquid Shell. 33 I smaller Doses, and more so, the more they are, by the diluent Process above set forth, prepared for their readier Circulation through the animal Fluids, requiring nothing to affish their Operation, but some lenient Purges to precede them in Cases of inward Exulcerations, or Foulnesses, which generally accompany this Disorder, and the Purges are even beneficial where those Cases do not exist.

These Purges then cleanse and expel the Ulcerated Matter, occasioned by the Stone or Gravel, and likewise the Slime or sizy Matter, which commonly settles upon these earthy or calculous Concretes, wherever they are seated towards the Kidneys, Uterus, or urinary Passages: And they are also requisite to predispose the Blood for receiving the Medicine, and increasing the Circulation; therefore gentle, moist, aperient Purges are required of the Nature of those pointed out in my first Directions, I wrote for the Vender Mr. Proctor; but as I therein excepted against Glauber Salts, I shall herein, according to my Promise, state

Glauber Salts are known to confift of the Alkaline Earth of the common Salt, and the Acid of Vitriol, both which Contents are prejudicial to those inward Ulcers, ever to be sufpected in Nephritic Affections: For as a Separation of this purging Salt ensues in the Seats of Digestion, the Alkaline Earth is inevitably heterogeneous to these Ulcers; and the Acid, by its astringent Power, coheres them improperly, by which Means the Medicine is re-

my Objections to them.

tarded

tarded in its Efficacy, and Impressions on the peccant Matter, and dangerous Inflammations of these Parts are the Consequences to be dreaded.

Neither are the falutary Ends aimed at in the Prescription of Purges obtained by these Salts; for as we want a constant gentle Discharge of the Matter, and a State of Fluidity in the Blood; I apprehend these are not well promoted or preserved by these Salts: for we may daily observe, that when Glauber Salts are taken, and their Purging is over, a Costiveness for several Days ensues thereon. The Vegetable Laxatives are therefore the properest for our Purpose, such as gently command two or three Stools a Day. And these I have ever noted for answering their Intentions the best.

Thus far may be fufficient for the present on the Liquid Shell; and should these my candid Endeavours, to propagate the Use of so salutary a Medicine, meet with a savourable Reception and Construction, I shall occasionally give the Public an Account of farther Experiments on it; as those have opened to me improvable Views of its being yet capable of more Use and Application, than I have hitherto suggested. I subjoin here the Directions for the Use of it in those Disorders wherein I have already seen it serviceable.

DIRECTIONS.

I. For the Stone in the Bladder or Kidneys.

S UCH as are afflicted with the Distemper of those pernicious clayey and calculous Concretions

cretions in the Bladder or Kidneys, must take every four or five Hours, from Fifty to Ninety Drops, in common foft Water, or White Wine, (but foft Water is the best Vehicle for this Medicine). In the Course of taking this Medicine, the Patients must keep their Bodies open, and at least have two or three Stools a Day. And if they are not naturally inclined to this Habit of Body, they must have Recourse to a small Dose of Lenitive Electuary, Stabl's Pills, or a small Draught made of Senna, Rhubarb, and Manna. viscid, hard Aliments, Salt, hot Spices, &c. are to be avoided; and only Gruels, Broth, Panado, and very light Meat roasted, and fuch Fish, that easily digest, are to be made use of. The most suitable Liquors are White Wine, particularly Rhenish Wine, either pure or mixed, with Barley-water, or Water and Toast.-Gentle Exercise and Taking the Air are also necessary: But due Regard must be had, that the Patient does not catch cold.

II. In the Gravel.

In this Case, the Liquid Shell is to be taken every 4 Hours, from 60 to 80 Drops, in White Wine or Water, or a Mixture made of common Water, Juniper-Water, Parsley-Water and Mint-Water. The same Rules in Regard of keeping the Body open, and the Regimen of the Diet, are also to be observed, as are mentioned in the sirst Directions for the Stone in the Bladder and Kidneys.

III. In Pains in the Breast and Flatulences.

Whereas these Grievances generally proceed from too much Acid in the Stomach, or other Parts of the Primæ Viæ, in such Cases, certain Relief may be expected from this Medicine, in a very short Time. But if this Case should proceed from any other Origin than Acid, there can be no Relief expected from this Remedy. But where Flatulences do proceed from the Causes before-mentioned, as they do for the most Part, the Liquid Shell is to be taken from 40 to 80 Drops, 3 or 4 Times a Day, in White Wine and Water.

IV. In a Strangury, or Retention of Urine.

In the last-mentioned Cases, every 4 Hours, from 50 to 70 Drops are to be taken in Parsley-Water, or in common Water, with a small Dose of Juniper-Water in it; and if Occasion requires, and the Patient is costive, a gentle small Dose of the Physic which is prescribed in the first Direction, must not be omitted.

V. In the Cardialgia or Heart-burn.

Let the Patient take, for 2 or 3 Days, at least 4 or 5 Times a Day, 70 or 80 Drops of the faid Liquid Shell, in fost common Water: But if Water is disagreeable to the Stomach, mix a couple of Tea-spoon-fulls of Rum with it; at the fourth Day take a Dose of Physic of Lenitive Electuary, or a Draught of Manna, Rhubarb

Dissertation on the Liquid Shell. 335. Rhubarb and Senna; and then repeat the Liquid Shell for 5 or 6 Days longer, as first directed; then a Draught of Physic again: And this Course to be continued, till you judge, that the Matter that occasions the Cardialgia is removed, which is easily perceived, by a keen Appetite and good Digestion of the Food.

N. B. A Breeding Woman may safely take the Liquid Shell, to ease the Heart-burn. But

all Purging Physic must be omitted.

VI. In acid Eructations and four Belchings.

The Patient, in this Case, must take very plentifully of the Liquid Shell, in the first 2 or 3 Days, every Hour 50 Drops in Water; and I may venture to say that the Liquid Shell, in these Circumstances, occasions an Effervescence with the Acid in the Stomach, by which Means it creates a Neutral Salt, and, by virtue of this Accident, or new Concretion in the Human Machine, it intirely purges off and expels the Cause. And if the Disease decreases, then the Use of the Liquid Shell may be likewise abated or lessened to 6, 5, or 4 Times a Day, till the Patient is cured.

VII. In the Gout.

Whereas all Disorders, whose material and formal Cause, or peccant Matter, consists in a calculous or chalky Substance, have an Affinity and Connexion with, and are very nearly and essentially related to one another, as having certainly one and the same Origin; which I attribute to there being too much Acid lodged and deposited in the Primæ Viæ; and therefore

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therefore as the Gout confifts in a Calculus of Chalk, that is chiefly lodged in the Joints, it came into my Thoughts to try the Liquid Shell, in this difmal Diftemper, --- to effay and see, --- if I could in any Sort ease or alleviate that most exquisite Pain; and, according to my Wishes, I have succeeded so many Times, in my Attempt to alleviate and relieve the Symptoms, and to render the Attacks or Fits of the Gout more tolerable and less excruciating, and perhaps much more rare than they otherwise would have been, that I am fo bold as to recommend it in this public Manner: Therefore, fuch that are afflicted with this Malady, let them take, when they have a Fit of it, every Hour, 50 Drops in Rhenish or Madeira Wine; and at every 3 or 4 Days, about 30 Grains of the best Rhubarb, till the Fit is gone off. But fuch as will make use of the Liquid Shell, as a Preservative to promote Ease, and to cause the Fits of this Distemper to be less fensibly felt, and to be more tranfient, let them take every Morning and Evening 60 Drops in Water, and twice in a Month a Dose of Rhubarb.

VIII. In Convulsions, Fevers, Gripings, and other Distempers in young Children, occasioned by Acids.

In Children and Infants, acid Crudities are the principal Origin of most of their Miseries; and then Gripes, Fevers, Convulsions, and even Instammations in their Gums, when breed-

ing

Differtation on the Liquid Shell. 337 ing their Teeth, may justly be attributed thereto. In these Cases, the Liquid Shell ought in Justice to be esteemed the best and safest Remedy in the whole Materia Medica. It most powerfully absorbs and destroys all Acids, cleanfing and purifying the Bowels, guards against and prevents Worms, and may be given from 5 to 12 Drops, in common Water, 3 or 4 Times a Day. The Parents and Nurses should be very cautious of giving young Children testaceous Powers, or opiate Cordials; the former clogging the Stomach, and hindering Digestion, and the latter not only has the fame dangerous Effect, but also stupifies the animal Spirits.

Occasional Remarks and Queries on the GLASTONBURY Waters.

THE great Noise these Waters have made in the Nation, and the many extraordinary Cures that are attributed to them, has led me to apprehend they deserve Inquiry, and such a one as may fully set forth, whether they really merit that Notice and Regard which common Fame has so liberally bestowed upon them; for my own Part, as a hearty Well-wisher to Mankind in general, I sincerely hope they may be found with all the sanative Qualities imaginable; and as I shall lay down my Thoughts openly and candidly in these loose Remarks, I trust I shall not be suspected of Prejudice on either side, my Design being purely to pave the Way for the Discovery of Truth.

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What is commonly faid in Favour, or against these Waters has no weight with me, as Experience and Chymical Analysations are the only Touch-stones whereby their Virtues can with Certainty be determined,

should they be intitled to any.

Curiofity has led me to make fome Experiments on one Bottle of the Water, as fold here in London, for Glastonbury Mineral Water; but from all my Trials, I never could discover the least Mineral Contents it had, and whether there are any Salts in it or not, I do not pretend to be absolutely certain, the Smallness of the Quantity, from which I made my Experiments, not being fufficient to extract them out; fome Medicinal Waters there are indeed, of which their Mineral Contents are fo extremely volatile, that they exhale fo quick, as never to be found after Exportation, or even carried any confiderable Distance from the Place; therefore, with fuch, no Tryals can be certainly depended on, but fuch as are made at the Spring Head.

Query. If the Glastonbury Waters are not of this Sort? and whether it would not be highly prudent and necessary, to engage some skilful Experimentalist, to try these Waters on the Spot ?

On opening the Bottle, I found a remarkable fœtid Smell, fuch as is generally occasioned by animal Substances, in a putrefying State; but from the best Information I can get, I don't find it has any fuch Smell at the Fountain-head, from hence arifes a reasonable Query with me:

> If it would not be deem'd more satisfactory to fearch the Spring thoroughly, to fee if the Current of this Water is not interlin'd with animal Substances?

I apprehend this fo much more necessary as the visionary Director to Mr Chancelor, informed him, that it run through the Graves of Martyrs and Saints, and from thence arose it's falutary Efficacy.

I have

I have further Reasons for so strict a Scrutiny, which are these; I mixed a large Quantity of Alkaline Salts with this Water, which did not in the least diffipate the fœtid Smell before mentioned, nor caused any Effervescenz or Ebullition, which in my Opinion, it must certainly have done, if this fœtid Smell had been produced from any mineral Substances whatever. I then poured Oil of Vitriol upon it, as much as was necessary to cause an Effervescenz or Ebullition, when there appeared on the Top a slimy Matter, very much resembling animal Substance; and it seemed natural to conclude, that this fœtid Smell was contained in the slimy Matter only.

What further Trials I made upon this Water, was with Galls, Oak, Bark, Tormentil Root, and other Aftringents of the fame Nature, which turn'd it of a brown Colour, not unlike the Liquor and Skins of Tanners, when these Aftringents are put in to tan the

Hides.

Query. What is this slimy, brown Matter? by what
Means is the fætid Smell preserved with
Alkaline Salts, and from whence does the
Colour with Astringents proceed?

I doubt not, but the Inhabitant of Bath (whoever he is) published the many remarkable Cases of Cures, with a good Intent, and I hope they may answer all the mutual End he designed by it; but permit me to say, there is a wide Difference between imaginary Distempers and real ones, and perhaps the Cure may stand upon the like uncertain Principal.

Query. Then if these Persons that are related as cured in those Cases, were really afflicted with those Diseases, it is said they were beated from?

In all the Accounts that I have feen of the Glastonbury Water, I don't find the least Mention made, in what Manner these Waters operate, either as Evacuatives, or as Alteratives; but all their good Effects are attributed 340 Occasional Remarks and Queries.

attributed to supernatural Causes; and here I think a Strict Inquiry and Examination of the Patients that have drank these Waters highly necessary, as to the Diforder they laboured under; for I will venture to fay, that if these Cures were really performed by these Waters, as reported to be, that we shall be able, on Examination, clearly to find out the natural Causes

from whence they have proceeded.

If this Water is abundantly rich impregnated with Ætherial Spiritus Rector, I do not wonder at the furprifing Cures that are attributed to it; 'twas from hence, that many Springs in the Day's of Priest-Craft were deem'd miraculous, by the wonderful Cures they performed by the help of the Ætherial Spirit they were fo richly imbibed with; and indeed it must be confessed; that the most falutary Waters of this Nature in the present Times, are too much neglected; I heartily wish the Glastonbury Spring may yield plentifully of this

Quality.

All Cures that are reported of the Glaffonbury Waters, have at many repeated Times been effected by the Shadwell Waters near London, and the Dog and Duck Waters in St George's-Fields, Southwark, of which indisputable Facts can be produced; but whatever extraordinary Cures have been performed by these juftly celebrated Waters, they never were recommended to the Public in fuch an enthusiastical Manner as those of Glastonbury, but the natural Causes fully affigned whereby the Cures were wrought. If these healing Qualities are contained in the Glastonbury Waters, let them be sufficiently set forth and accounted for in the same natural Manner, as it would be unjust to deprive them of of any real Merit they are intitled too; but to attribute it to supernatural Causes, greatly weakens the Credit of it, and is highly abominable in fo refined and polite a Nation as undoubtedly that of Great-Britain is, should run into fuch ridiculous Superstitions as they now do, in Respect of this Glastonbury Water, which equals that of Romish Idolatry, for which Israel of old was so severely

All Medicines that are capable of doing great Good, may (injudiciously administered) do great Harm, so as to become poisonous to the Human Constitution; 'tis for this Reason, that all Medicines require to be judgmatically administer'd: This experienced and undoubted Rule, is in nothing more verified than in the Medicinal Mineral Waters, which ought to be used with the greatest Caution imaginable; and Experience has taught me to believe, that if all Mineral Waters in general, were used in lesser Quantities than the present Fashion of the Times, that they would produce more sanative Effects; whereas by immoderate Use, they do great Mischief, and oftener increases the Distemper, or brings on others, than that it conduces to Health.

Whatever Mr Chancelor's Visionary Director was, I will not pretend to say, but this I will affirm, that he understood Nature, by his ordering the space of seven Days between each Time of drinking this Water; therefore, if it has any medicinal Contents, there is Time for it to search and work with the Blood, into the most minute capillary Vessels, and impart it's medicinal Contents to the animal Fluids, and any where else it is required; but if every Day, large Quantities of Water is repeated, it destroys and breaks the circulatory Vessels, whereby the medicinal Contents are disabled to perform their Function; so that wherever the Reverend Letter Writer of the Glastonbury Waters, founds his supernatural * Suppositions upon, are in reality nothing else but natural Consequences.

If ever I live to publish my Treatise on the Natural Salutary Use of Medicinal Mineral Waters, I hope to have it in my Power to offer new Lights to the World in this Particular.

^{*} Vide Virtues and Efficacy of the Water of Glaffonbury, &cc. &cc.

THE

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